August 1959

MANAGEMENT *and* BUSINESS AUTOMATION

The Role of Electronic Communications in Business Automation

MOTOROLA'S BUSINESS AUTOMATION* BUYING TEAM

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* Basically, it is the transfer of repetitive clerical jobs—now performed by people—to mechanical, automatic, electro-mechanical, or electronic methods.

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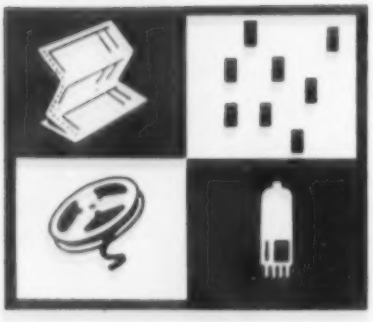

MANAGEMENT *and* BUSINESS AUTOMATION

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Robert Harding, right, assistant chief engineer of Arma division, American Bosch Arma Corporation, points out to Frank McShane, cost-improvement expert, the high quality and contrast of an 11"x17" stock print reduced from an original 22"x34" drawing. The print is a sample of many run off on an offset duplicator from an inexpensive offset paper master prepared xerographically by XeroX Model 1218 copying equipment.

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. . . reproducing

- *engineering drawings*
- *drawing-change notices*
- *specifications sheets*
- *parts lists*

Arma Division, American Bosch Arma Corporation, is saving $82,000 a year in the rapid reproduction of engineering drawings, drawing-change notices, specification sheets, and parts lists. Arma manufactures midget brains for missiles and other intricate electronic devices.

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Bendix G-15

multi-code, high-speed

PAPER TAPE READER

Punched paper tape from almost any device or system equipped with a punch can now be read directly and at high speed into the Bendix G-15 computer. The unique Model PR-2 photoelectric reader accepts paper tapes *punched in any numeric* code by cash registers, accounting machines, adding machines, typewriters, analog-to-digital converters, and similar devices, whether operated manually or as part of an automatic data collecting system.

Applications of the G-15 and PR-2 accessory cover a broad range of data sources. For example, in research there are wind tunnels and engine test stands, telemeter equipped missile and experimental aircraft, and strain gauge and other types of laboratory test systems. In industry there are process monitors and data loggers, production line test and measuring devices, and inventory recorders. In business there are point-of-sale recorders and office machines of many types.

The PR-2 accepts paper tapes of 5, 6, 7 or 8 channels. It reads unidirectionally at 400 characters/second, allowing rapid input of data collected by one or many devices, regardless of their punching speed. It stops on one character, eliminating the need for special spacing following a stop code.

A plug-in matrix may be quickly replaced or rewired, enabling the user to change external codes at will. This matrix transforms the external code into standard G-15 codes and enters the information into the computer. Reel-less tape winding and unwinding facilities accept tapes from most punching devices with minimum handling.

With this new Bendix Computer development, flexible communication between computers and their sources of data reaches a new peak. Rather than modify the data originating equipment to fit the requirements of the computer, the computer can now be adapted in a few short seconds to the characteristics of its data source. For more information on Model PR-2 write to Bendix Computer Division, Bendix Aviation Corporation, Los Angeles 45, California. Department D-12.

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MANAGEMENT *and* BUSINESS AUTOMATION

August, 1959
Vol. 2, No. 2

Reporting to management on new ideas, developments, applications, results, and the human impact of office automation in all areas of commerce, industry and government.

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Microwave relay, a relatively unknown quantity to business today, is destined as tomorrow's transmission medium for point-to-point communication.

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Rising out of the "gimmick" class, TV is proving to have more and more business applications every day.

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Letters

Editor's Note—The following letters are representative of the many that flowed into the Research Department during the past month. The reception of the machine accounting salary survey indicates a need for more information of this kind, and MANAGEMENT AND BUSINESS AUTOMATION *is planning to follow through with a national survey of positions and salaries related to computer operations.*

Dear Sir:

Let me congratulate you on your survey of machine accounting salaries. The position and company-size categories were well chosen and the survey has already proven helpful to me. I should appreciate your sending me detailed surveys from Cincinnati, Chicago, Cleveland, Pittsburgh, and St. Louis.

Raymond C. Wissel
Assistant Treasurer
E. Kahn's Sons Co.
Cincinnati

Dear Sir:

I have just completed the very excellent article entitled, "A Survey of Machine Accounting Salaries". I would greatly appreciate receiving detailed information of this survey for Los Angeles.

Our Computation and Data Reduction Center employs approximately 40 people with the skills you have delineated. This detailed data would be extremely useful to me in the administration of our wage and salary program.

You are to be congratulated for your outstanding publication.

R. H. Wheaton
Administrative Staff
Computation and Data Reduction Center
Space Technology Laboratories, Inc.
Los Angeles

Dear Sir:

The excellent feature in your June issue entitled "A Survey of Machine Accounting Salaries" closed with the information that additional detailed reports could be obtained for the writing. I will be most grateful if you will please send this data covering Chicago to me. Needless to say, we here find your publication informative, instructive, and decidedly entertaining.

Marvin L. Ford
Systems and Procedures
Combustion Engineering, Inc.
Chicago

Dear Sir:

Will you please send us the detailed report of machine accounting salaries for the Kansas City, Mo. area as developed from your survey.

I would also like to obtain similar information regarding salaries for both supervisory and operating personnel in computer installations in the Midwest area. Any information or source of such information which you could give me would be greatly appreciated.

John W. Snider
Assistant Cashier
Federal Reserve Bank of Kansas City
Kansas City, Mo.

Ed. Note—Such a survey is already underway.

Dear Sir:

In your June issue you suggest that readers may obtain detailed reports of the various cities involved in your survey of machine accounting salaries. We would be interested in obtaining copies as offered.

This is a good opportunity to compliment you on your new publication. Of particular interest to us have been articles touching on management's role in data processing.

R. E. Anderson
President
Span Data Processing Center, Inc.
Hartford, Conn.

Dear Sir:

In reading over your June issue, I found the survey of machine accounting salaries very interesting. I would like the detailed report on Minneapolis.

I have only one question in regard to the survey. Was any work done in the extreme southern areas of the nation, such as in cities in Florida? I would be interested in any information for that area also.

Cecil D. Taylor
Automation Institute
Minneapolis

Ed. Note—New Orleans and Atlanta were representative of the Deep South in the survey.

Dear Sir:

I read with interest the article on Machine Accounting Salaries. It was particularly appropriate since we have just been re-evaluating our entire salary structure in the tabulating area.

We noted that the general average of extra pay for second shift operations was five to ten cents per hour. We had checked with several installations in the New York area and found that generally 10 percent additional pay would be required for second shift work. If your survey indicates different facts, we would be interested in your advising us.

Edward L. Parry
Company Systems Coordination
Treasurer's Dept.
United States Rubber Co.
New York City

Ed. Note—The 10 percent figure is just about right for the New York area.

Dear Sir:

Would you please forward detailed reports of cities involved in your survey of machine accounting salaries.

This article, as well as the one entitled "A Case of Missing Management", we believe to have been very timely, and we are certain that the data contained in the reports of your survey will be of great assistance to us.

R. E. Quigley
Comptroller
National Rejector, Inc.
St. Louis

Address letters to the Editor, MANAGEMENT and BUSINESS AUTOMATION, 600 W. Jackson, Chicago 6, Ill.

. . . *from the*

Publisher's Desk

A HEALTHY sign along the road to greater automation in business is the high degree of interest being shown in new products and systems.

Each month MBA's Reader Service Bureau has been processing a greater number of inquiries concerning the products reviewed on the Showcase pages. There is also an increase in the number of requests for more information about products shown for the first time by manufacturers in their advertisements.

The trend is significant in one respect because it shows a certain restlessness among executives responsible for automation and data processing. It shows that you, the reader, are not satisfied with the status quo but have an overt desire to find new ways of doing things and better equipment with which to do them.

Without this apparently insatiable curiosity for what is new and untried, the growth of automation would be moving much too slowly. And to restrict its pace at this point could be catastrophic in some fields where automation is providing the margin between profit and loss.

The selection of products for the MBA Showcase is not always easy. Our editors must maintain constant check on new developments as they are announced and in many cases prior to announcement. Information is gathered by mail, at conventions and exhibits, and by personal contacts. It's a job which can't be put aside even for a day.

In addition to the Showcase descriptions, which concern products which are already on the market, the editors provide you with one or two Product Previews in each issue. These previews concern equipment or systems that are not yet on the market, but because of their unique characteristics merit some advance description. In many cases these products will not be available for months or even a year. Others may be available by the time the issue reaches you.

The products chosen in all cases represent a major breakthrough which should be given special emphasis.

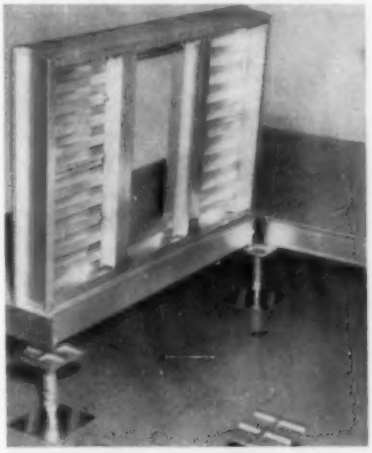
Your curiosity is wonderful. We'll try to keep it satisfied.

Charles W. Gilbert

WACO

Raised Floors Give Perfect Performance

Reinforced panels eliminate stringers, permit total access!



WACO "Series 300" raised floors feature reinforced, aluminum panels with stringer-free installation to permit total access to sub-floor; allow cut-outs anywhere on the panel, even after installation, while retaining maximum strength, minimum deflection. Adjustable pedestals assure perfectly level floor.

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MANAGEMENT *and* **BUSINESS AUTOMATION**

The Name's the Same for NMAA

For a few hours during the annual conference at St. Louis, the National Machine Accountants Association became history and the NMAA directors celebrated the birth of the Data Processing Management Association.

The birth, it turned out, was premature—and the association quickly reverted to its original name. The conflict arose after the directors had voted that the new name be adopted.

It was then learned that a small group in Dallas, Tex., had the identical name chosen, and they were protesting the NMAA action. The directors reconvened and rescinded their name-change action, instructing the executive board to investigate the matter further and report possible action to the directors at the 1960 mid-year meeting in Fort Worth, Tex.

The conference, held at the Chase-Park Plaza hotels, attracted 1,700 members and 47 exhibitors.

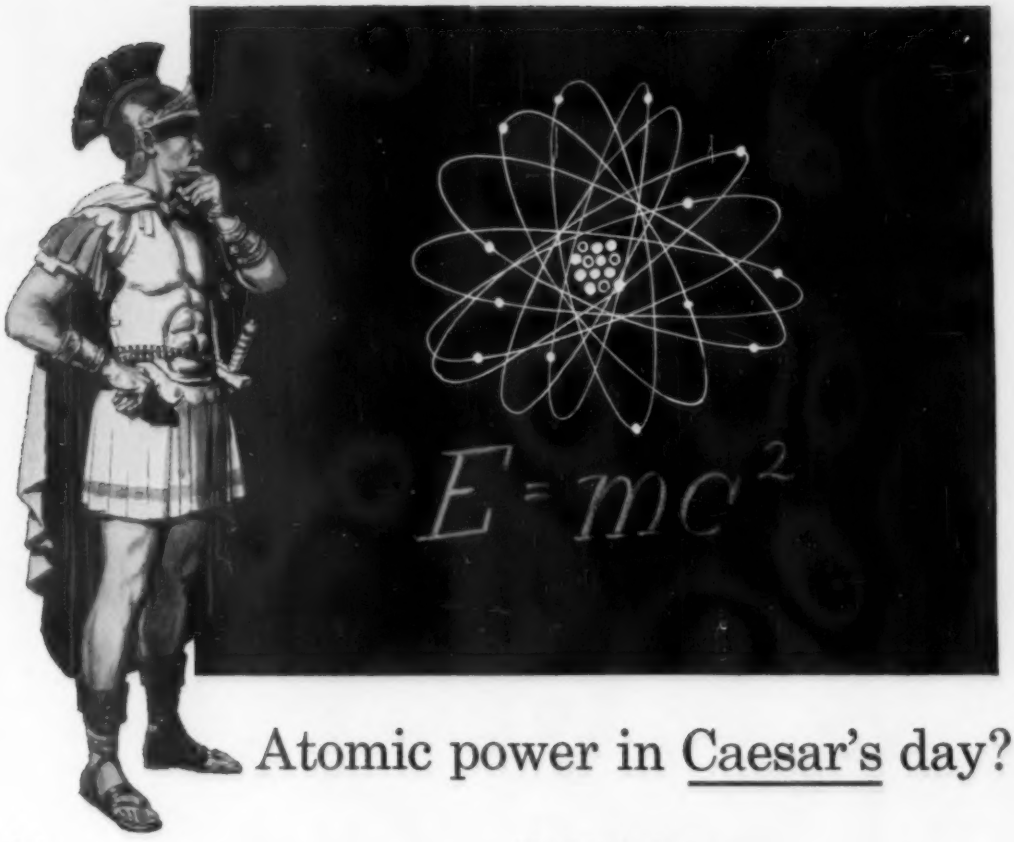
D. B. Paquin of Lybrand, Ross Brothers and Montgomery, Chicago, was the unanimous choice for president for the 1959-60 term. The new executive vice president is L. W. Montgomery, Interstate Oil Pipe Line Co., Shreveport, La.

Elected as vice presidents were: A. G. Pia, Salt Lake City, by-laws; R. S. Gilmore, San Diego, chapter organization; S. T. Reinhart, Rochester, N.Y., conference; W. C. Andrews, Jr., San Francisco, education; D. T. Barber, Toronto, Canada, library and publications; E. F. Judge, Wichita, Kan., publicity and awards; J. S. Boswell, Cleveland, research and advisory; J. L. Neumiller, San Francisco, 1960 conference. Clyde DuVall, Chicago, was re-elected Treasurer.

It was announced that the NMAA headquarters, now located in Paris, Ill., will soon be moved to the Chicago suburb of Arlington Heights. Detroit was selected as the site for the 1963 conference. Next year's meeting will be held in San Francisco.

William A. Taylor, St. Louis, above right, was one of two winners who received a $100 check from Wilson Jones Co. for estimating the correct number of nylon binder posts in a bowl at the firm's exhibit. President D. B. Paquin made the award.

John F. Robinson, director of advertising and public relations for Standard Register Co., displays keys for 1959 Simca sedan donated by company as a pre-registration bonus and awarded to Robert J. DeGray, Hartford, Conn., at close of NMAA Conference. Looking on are Beverly Wright, Miss Missouri of 1958, and Eugene Haessig, conference V.P.



Atomic power in Caesar's day?

Certainly!

It was there, in the ground, in the air and water. It always had been. There are no more "raw materials" today than there were when Rome ruled the world.

The only thing new is knowledge . . . knowledge of how to get at and rearrange raw materials. Every invention of modern times was "available" to Rameses, Caesar, Charlemagne.

In this sense, then, we have available *today* in existing raw materials the inventions that can make our lives longer, happier, and inconceivably easier. We need only *knowledge* to bring them into reality.

Could there possibly be a better argument for the strengthening of our *sources* of knowledge—our colleges and universities? Can we possibly deny that the welfare, progress—indeed the very *fate*—of our nation depends on the quality of knowledge generated and transmitted by these institutions of higher learning?

It is almost unbelievable that a society such as ours, which has profited so vastly from an accelerated accumuation of knowledge, should allow anything to threaten he wellsprings of our learning.

Yet this is the case

The crisis that confronts our colleges today threatens to weaken seriously their ability to produce the kind of graduates who can assimilate and carry forward our rich heritage of learning.

The crisis is composed of several elements: a salary scale that is driving away from teaching the kind of mind *most qualified* to teach; overcrowded classrooms; and a mounting pressure for enrollment that will *double* by 1967.

In a very real sense our personal and national progress depends on our colleges. They *must* have our aid.

Help the colleges or universities of your choice. Help them plan for stronger faculties and expansion. The returns will be greater than you think.

If you want to know what the college crisis means to you, write for a free booklet to: HIGHER EDUCATION, Box 36, Times Square Station, New York 36, New York.

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An MBA News Feature

RCA Opens Data Processing Center

First in a series of computer service centers available to small and large businesses alike.

THE first of a series of Computer Service Centers which will make electronic data processing service available to small as well as large business firms has been opened by the Radio Corporation of America at its Cherry Hill plant near Camden, N.J. Using the RCA 501, an all-transistor business data system, the center will provide around-the-clock service for business, industry and government; testing and checking customer programs, helping train customer operators and programmers and demonstrating specific applications to management personnel.

Initially, the installation is handling paper work for the Fidelity-Philadelphia Trust Company until the bank's own 501 system, now on order, goes into operations next year. (See MANAGEMENT AND BUSINESS AUTOMATION, July issue)

In opening the new center for business, John L. Burns, RCA President, voiced the prediction that "the day may not be far off when it will be as easy for a small businessman to make use of a data processing center as it is for a housewife to use a 'laundromat'." Burns pointed out that at present only about 3,000 of America's larger firms could justify the economics of full-scale EDP systems. The RCA computer center project will swell this potential by more than 30,000 companies who could profitably use data processing service, he said.

The Cherry Hill center is a setting of carpeted floors and colorful decor. The 501 data processing system occupies the center's main display and observation area. The computer and companion equipment are viewed through a glass floor-to-ceiling partition with two-way communications between the operator and the receptionist guide.

The new data service center at the Cherry Hill Plant was designed to help solve the paperwork problems of business firms, both large and small. The meeting room at the left is used to train future users.

A supervisor instructs an operator at the control console of the RCA 501 which will be available to handle data processing problems for any size business.

In addition to the main display room, there are separated lecture areas where instructors will indoctrinate future users in the art of EDP with the 501. This area also is employed in continuing RCA's program of executive seminars for representatives of business and government agencies.

Folding walls permit the re-arrangement of the various lecture and training rooms. Card punching, reading and other peripheral equipment are housed in a third section of the center. Also housed in this section is the RCA Bizmac, the giant computer system that preceded the 501 and which is still active at such jobs as accounting for the Army's vast inventory of tank and automotive spare parts all over the world. The entire center is comfortably air-conditioned.

In explaining the center's operation, a spokesman acknowledged that most companies are reluctant to send their source documents relating to confidential aspects of their business to outside data processing agencies. As a consequence, he said, most service bureau operations handle only a small part of a client's data, generally that part which is not confidential.

The RCA concept of a computer service center, he added, will bring into play electronic devices in the customers office. By means of these instruments, data will be transmitted in computer language to the center, processed and relayed back over the same communication channels to a high speed printer at the originating point. The entire operation will be confidential, no one at the center having examined or handled the data.

Coinciding with the opening of the center was the announcement by Burns that a second Computer Service Center is to open in October in the Wall Street financial district. This center will be devoted exclusively to the mammoth paperwork problems of New York brokerage houses.

The Wire Room of United Air Lines' private wire system, heart of a modern, nation-wide communications network.

The Role Of Electronic Communications In Business Automation

A SWIFT, constant and accurate flow of data is basic to any system of business automation. Electronic communications have made such a flow possible. Today, with a choice that includes telephone and telegraph networks, two-way radio, closed-circuit television, facsimile transmission, microwave relay, intercom systems, centralized dictation and pneumatic tubes, American business can communicate by voice, with printed words, and in machine language—all with electronic speed and precision.

And yet, in many data processing applications, communications prove to be the weakest link in the system. This is due, in part, to management's inadequate knowledge of the many types of communication facilities available. Until recently, it has also been due to the suppliers' failure to relate their equipment to the needs of data transmittal.

In an effort to strengthen this weak link, the following pages reveal a comprehensive round-up of electronic communication systems in action. Applications range from nation-wide networks transmitting data for centralized computer operations to the simple, but effective, intra-plant installations.

Whether management's problem involves transmission of data within an office or between cities, the communication industry appears to have a practicable and efficient electronic solution. The contents of this special issue give evidence of the tremendous progress and potential of this new dynamic in business automation.

UNITED AIR LINES
Communication Center
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WESTERN UNION
UNITED
UNITED

Nation's Lifeline: Direct Wire

Walter P. Marshall, president of Western Union, is pictured here as he sent the first Telex message inaugurating automatic customer-to-customer telegraph exchange service between subscribers in the United States.

Wires link data processing systems giving management a greater degree of control over far-flung operations.

THE millions of miles of wire and cable that make up the communication lifeline of American business are a dramatic tribute to the genius, labors and perseverance of many men—from Morse and Bell to today's laboratory pioneers.

Today networks of wire, linked with data processing systems, provide management with rapid communications and the means of exercising control over geographically decentralized industrial and transportation operations. These networks, in both an inter and intra-company capacity, are playing an ever-increasing role in business automation.

Certainly, Samuel Finley Breese Morse did not visualize the vast scope attained by the communications medium he launched in 1837 when he sent a message around the room on wires. Since May 24, 1844, when the first completed telegraph line, linking Baltimore with Washington, D.C., was formally opened, the infant has grown to a giant spider, spinning its endless web of wire across the nation—and around the world. With it came the first of America's great communication enterprises—Western Union.

Some 30 years later, Alexander Graham Bell invented the telephone, and another giant was in the making. His invention led to the establishment of the Bell System, and in 1885, to the creation of the American Telephone and Telegraph Co.

Telegraph linked the nation by code and telephone soon transmitted the human voice from coast to coast, but as business and industry became more complex, the need for greater speed became evident.

The compatibility of telegraphic punched tape with punched card and tape input for data proc-

The "wire room" of Sylvania's communication center at Camillus, N.Y., heart of the firm's nation-wide data and message network. Other private wire services have boomed to a $52 million a year business for Western Union.

essing systems has provided the impetus for the present concept in business communication.

Use of wire networks ranges from the simple point-to-point transmission of buy and sell information to the assembling and redistribution of complex operational and accounting data. The "common language" concept has made it possible to transmit huge payrolls and inventories over thousands of miles from varied points and gather the data into a centrally located computer—all in the matter of minutes.

Economy of wire networks is indicated in the fact that some companies urge use of the network for intra-company communications because it is cheaper than letter writing.

A.T. & T.—empire of wire

The bulk of direct wire facilities are provided by two firms, A.T. & T. and Western Union. According to Walter P. Marshall, president of Western Union, the leasing of private wire systems to industry and government produces more than one-fourth of his company's gross revenue. WU has installed and leased more than 2,000 private wire systems—using approximately 3 million miles of circuits.

A.T. & T., with its advantage of 63 million miles of long distance circuits, has by far the greater amount of system installations. Other companies that have contributed to the communication scene include General Telephone and International Telephone and Telegraph.

Western Union's largest single system is the U.S. Air Force's 250,000-mile network, but the bulk of the network total is overwhelmingly in the service of private enterprise. Largest of the industrial users is General Electric—with 87,179 miles of circuits linking some 179 points throughout the land. Another large network services the International Business Machine Corp. This 25,000-mile system links 245 coast-to-coast points including plants, laboratories, offices and parts centers. A daily volume of more than 250,000 workers is handled by automatic tape transmitters —with the simple press of a button starting a taped message moving to as many as sixteen destinations simultaneously.

The General Dynamics Corp. recently inaugurated a 15,000-mile private wire system for handling communications and data between its 62 plants and offices across the continent. Major centers linked by the system include the corporation's Convair Division in San Diego, manufacturer of supersonic planes and the Atlas intercontinental ballistic missile; Convair's Ft. Worth plant, home of the world's fastest bomber, the B-58; Canadair Limited in Montreal; the Electric Boat Division, atomic submarine shipyard in Connecticut; and the electronic and telecommu-

Charles G. Mortimer (right) president of General Foods, watches as a teletype operator sends a message over the high-speed network that links 38 GF facilities in 31 cities. Carl E. Wideberg (left) of A.T. & T. looks on.

nications manufacturing center at the Stromberg-Carlson Division in Rochester, N.Y.

Messages and data, in the form of perforated tape, pass through special transmitters and instantly and automatically flash to the centers where transmitting equipment provides push-button selection of the desired destinations. Each message passing through the switching center is automatically numbered in sequence. This number provides a running record for ready reference to all communications transmitted during the day, making the loss of a message virtually impossible.

Air, rail and plant

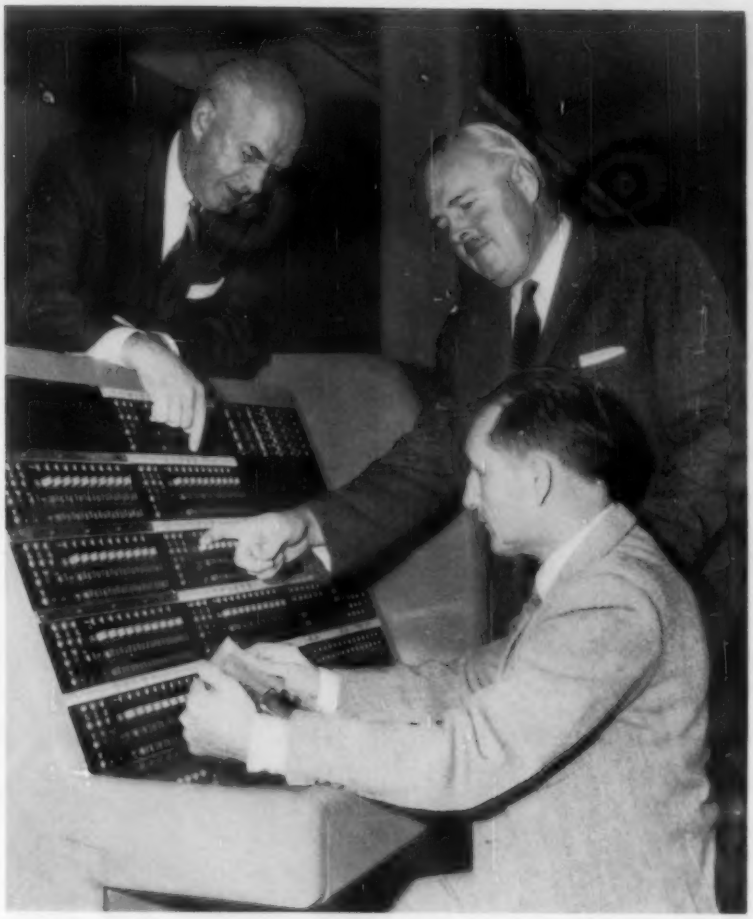
The airlines have made extensive use of high-speed communication systems to maintain control over their complex reservations problem. Space, the airline's "product," is a highly perishable item. An empty seat on a departing plane is a 100 percent markdown. To avoid these "inventory" losses, airlines are linking their communication system with computers which will feed back to every office the up-to-the-minute status of every seat on every plane. In addition, many airlines transmit ticket information in the form of punched cards, using Transceivers and other related equipment for sending and receiving.

Even the railroads—who pioneered the use of telegraph for communications but were reluctant to accept the integrated data processing theory—have taken sweeping steps to automate their tremendous paperwork burden. Today, cards and tapes transmit freight car numbers, bills of lading and other operating data over wire, far in advance of actual train movement. Modern data processing centers instantly convert this information into detailed reports, giving railroad management current and accurate operating information never before available.

One of the first companies to link its sales and order operation to a central computer by means of a nation-wide data communication system is the Owens-Corning Fiberglass Corp. of Toledo, Ohio. Orders written on Teletypewriters in any of the 36 sales offices in the country will be received in the central office on punched tape and fed directly into the computer. The machine will price the order, adjust inventory and punch out an acknowledgement copy and shipping order in tape form. This is then routed by wire to one of the eight plants and there the tape will create an actual order for shipment.

But, a communication system doesn't have to span thousands of miles to pay off for management. In the Small Aircraft Engine Department of the General Electric Co. in Lynn, Mass., a mechanized materials procurement system has resulted in a cost savings of many thousands of dollars and increased efficiency.

Thought to be the largest known installation of its type in any one company plant, the system uses 75 pieces of teletype equipment and processes as many as 200 to 300 orders daily. The procurement routine encompasses the areas of production



Braniff International Airways has an 11,000 mile teletype network centered in Kansas City, Mo. Shown here is Arnold Pluff (seated), chief of the message center, explaining control panel to V. Chase Watson (center), Braniff sales manager, and A. J. Esrey, A.T. & T. general manager for the western area.

control, purchasing, cost accounting, receiving, receiving inspection, finished stores, accounts payable, and tabulating.

When the need arises for the procurement of material or services, a "Request for Material" is prepared by production control. This request is transmitted on the "Request for Material Circuit." Cost accounting and purchasing receive a page copy and purchasing also receives a punched paper tape. Requests for material from areas not serviced by the teletype network may be sent to purchasing on a handwritten form. These orders will follow the teletype procedure from that point on.

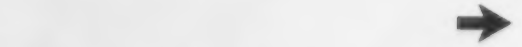
Writing with tape

Purchasing prepares a "Request for Quotation," if necessary, and subsequently a purchase order making use of the punched tape to type any repetitive data originating from the request for material. When the purchase order is prepared, it is transmitted on the "Receiving Report Circuit." A copy of the receiving report is received by the originating production control unit, purchasing, accounts payable, customer, or receiving inspection. A paper tape is received by receiving inspection and the tabulating department.

When the material moves from receiving to receiving inspection and the necessary inspections have been performed, receiving inspection transmits the necessary inspection information (quantity accepted, rejected, etc.), on the "Receiving Inspection Circuit." A page copy of the quality control record is received in "Finished Stores," the originating production control unit, and purchasing. A paper tape will be received in tabulating and finished stores.

When the accepted material moves from receiving inspection to finished stores, finished stores transmits the quantity accepted to tabulating in

Continued on Page 38



Control center of the Ohio Oil Company's new microwave communications system in Findlay, Ohio. The center furnishes control data for the supply, transportation, refining, marketing and other departments of the midwestern firm.

THE WAVE OF TOMORROW

Microwave relay opens a new era of data transmission. Already proven efficient and economical, it awaits action by the FCC for business use.

MICROWAVE relay, today an unknown quantity to the average business executive, seems destined to be tomorrow's accepted transmission medium for all-purpose, point-to-point communication.

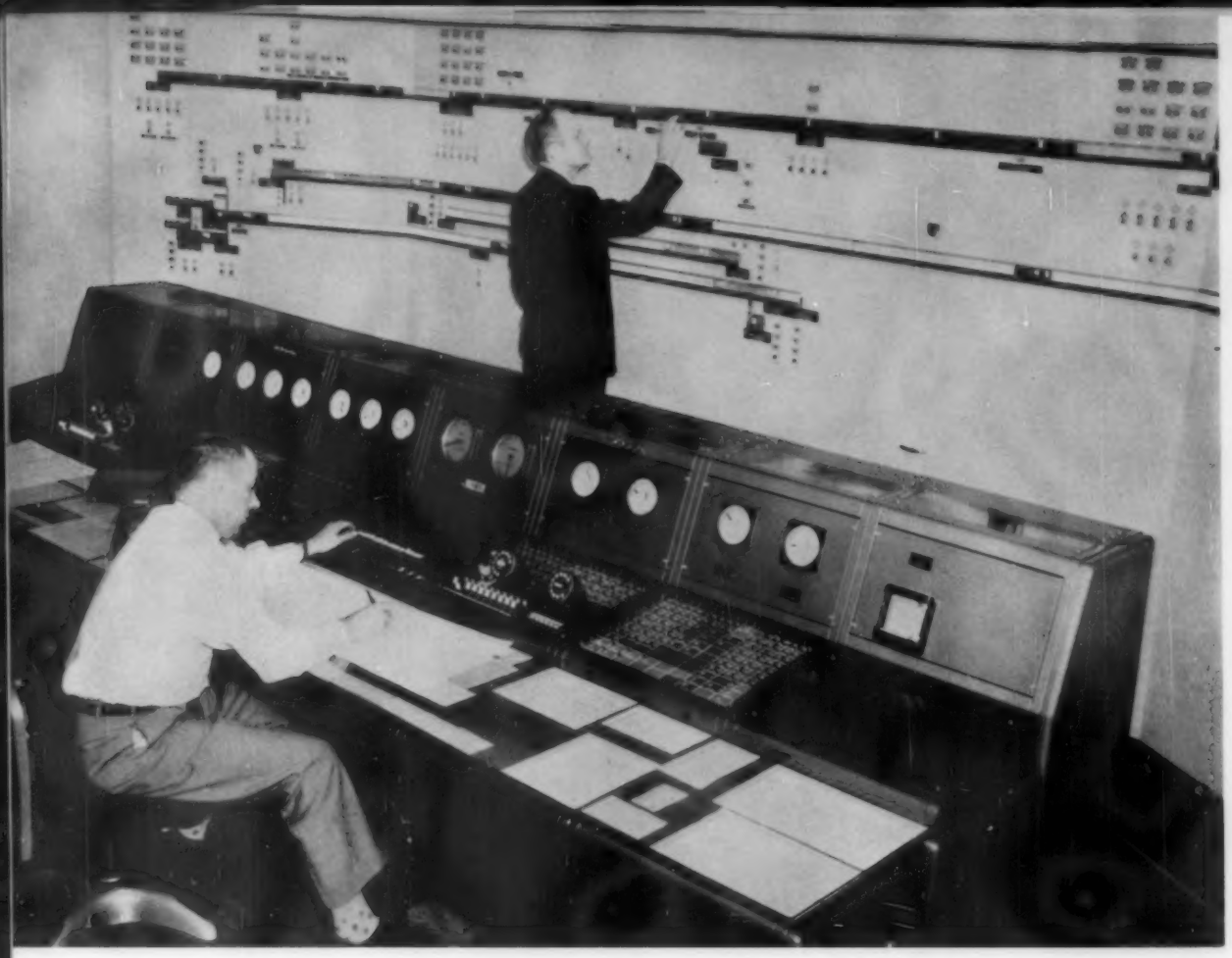
Microwave's success in relaying voice, teletype, facsimile, telemetering signals and data transmission has already been established by many users, particularly in the petroleum industry. The adaptation of microwave to the communication needs of the entire business world awaits only a decision by the Federal Communications Commission to open microwave channels for general business use. All present systems—excepting those of the common carriers such as the Bell System and Western Union—are operating on FCC renewable development permits which are only good for a single year.

"Micro" means short, and microwaves, as the term implies, are radio waves of extremely short lengths. Their existence was known to the communication pioneers of the early 19th Century, but their nature and potential was not fully understood until the start of World War II.

At that time new research was being done on the application of communication techniques to global war, and from this research came the development of radar. Radar detection relies on the direction of radio energy to a target which can intercept the transmitted energy and reflect it. Microwave uses similar principles. Instead of using wire lines, like telephone lines strung along a road, microwave employs a radio beam which relays information—voice, signals or data—between terminals and intermediate stations.

High speed, low cost

It is economical in terms of cost-per-mile when compared with conventional transmission systems. With it, there are none of the interruptions caused by adverse weather conditions such as



line breaks due to wind, sleet and snow—in short, for businesses that rely on communications for control and coordination of many functions over long distances, microwave offers an opportunity for speedier service at lower operating costs.

The use of microwave is limited only by the imagination of the user—assuming a green light by the FCC. Equipment available commercially today can carry on a *single* microwave channel hundreds of simultaneous voice channels. A single voice channel within this group can easily handle digital data at terrific speeds and can accommodate up to 15 teletype messages simultaneously.

Further, a single channel can carry facsimile information for the transmission of such items as invoices, bills of lading and engineering drawings.

Actually, a single microwave channel has a potential for information that few if any single user might fully utilize.

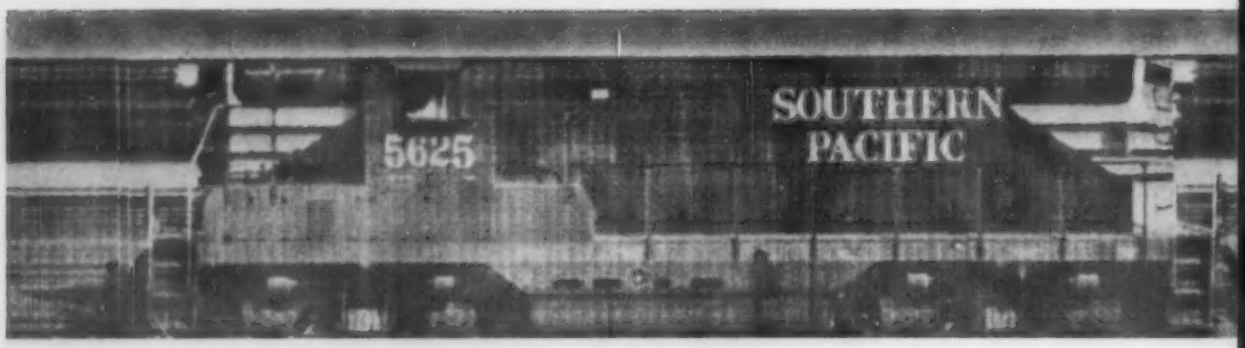
Typical of a system in operation is the one employed by the Ohio Oil Co. of Findlay, Ohio. Microwave provides communications and data for Ohio Oil's production, supply, transportation, refining, marketing and other departments. The system also provides centralized supervision of the entire pipeline—which moves through Illinois, Indiana and Ohio—through selective telemetering and control.

Seated at the master console at Findlay, nerve center for the entire system, the supervisor can summon data from any desired station on the line by merely pushing a button. For example, when he desires to check the level of a storage tank a button for the specific tank is depressed. The level transmitter on the tank sends a level signal by microwave which indicates to the console operator the contents of the tank to the nearest $\frac{1}{8}$ inch over the foot mark.

Data gathering time cut

Flow meters at the pumping stations continuously measure the flow through the station. This information is converted into teleprinter code and transmitted to Findlay where it is printed out. This same information can be converted to punch cards for billing and analysis.

Much of the data required by the Findlay office was collected previously by individual telephone reports. Now, instead of waiting for hourly reports or calling for specific information, it is only necessary to press a button. Microwave eliminates much of the time consuming data gath-



Actual picture of a moving train relayed by microwave from trackside television camera and reproduced simultaneously by Videograph printer, new development of the A. B. Dick Co. The New York Central Railroad has conducted a feasibility study of this application for recording freight car movements in and out of marshalling yards. Using microwave, the Videograph printer can reproduce a picture of an entire train as it passes, showing car numbers, railroad name and the like.

ering formerly required of field men and automatically gives better efficiency to both company and customer service functions.

A General Electric Co. microwave system, recently selected by the Philadelphia Water Department to automate the city's far-flung water control system, will provide a complete readout from 92 different points in the 3,000 mile system every minute and a half. Such information as water levels in basins, reservoirs and storage tanks; river elevations; total pumping rate of individual stations; and flow rates in and out of reservoirs is transmitted by microwave to the load control center where the information is processed digitally in the data logging center.

During normal operation a printed record of all measurements is produced at regular intervals. As a by-product of the printed readout process a punched tape is created which may be used to generate punched cards for computer use.

From sea to shore

Motorola Communications and Electronics, Inc., is designing a 175-mile microwave system to provide communications and control for the off-shore oil and gas wells in the Gulf of Mexico and the Louisiana Coast on-shore stations of the CATC (Continental Oil, Atlantic Refining, Tide Water Associated and Cities Service). Microwave will handle daily drilling and operating reports, weather information, production and gauging reports and permit more complete explanation of well logs direct from platforms to the office.

Eventually, many of the platforms will be entirely unmanned, except for visits by maintenance personnel. Motorola has already installed one such system for Pure Oil, in offshore Vermilion Parish, La., which allows a gas condensate production installation to operate unmanned as information and control pulses are transmitted over microwave between the satellite and a master platform.

The Denver and Rio Grande Western Railroad plans to use microwave for high speed facsimile transmission of waybills and other documents. A Videograph facsimile scanner and printer (see Product Preview, page 37) will be installed at each of seven freight terminals over the eight hundred miles of the railroad's system. Copies of waybills, train lists, wheel report forms and written messages can be instantaneously transmitted

"The boss is taking his TV monitor with him on vacation."

Virginia State Police officials inspect the automatic switchboard of the microwave radio and teleprinter circuit. Produced by Kleinschmidt Laboratories, this switchboard routes and "remembers" messages during a 24-hour day in unattended operation.

by the Videograph process over the microwave system between any of the seven terminals.

The versatility of microwave operations is perhaps best illustrated by the system in use by the Virginia State Police. The heart of their communications network is a unique microwave radio and teleprinter circuit serving exclusively the eight most active and important stations in the state. The "brains" of the system is an automatic switchboard, designed by Kleinschmidt Laboratories of Deerfield, Ill.

Neither storm nor strike . . .

It automatically routes all calls to the proper destination, gives a "busy" signal if a particular station is sending or receiving a teleprinted message, clears all circuits for a "general alarm" or emergency message, and even remembers and resumes transmission of messages which were interrupted by the general alarm.

The microwave system, a product of RCA, makes it possible for four two-way communications to be going on at once on the eight-station circuit. Another advantage of the system is that it is not dependent on outside sources of power. Should a strike, storm, or other circumstances result in a breakdown of telephone communications, the circuits would still be operative as they are equipped with their own power.

With the advent of the computer more and more business operations are moving toward centralized data processing. This increases the demands on communication systems and calls for new standards of reliability and speed. Microwave, by actual tests, seems to be more than adequate to the needs.

Leading microwave equipment manufacturers include Motorola, RCA, Philco, General Electric and Collins Radio. The list is growing daily as more and more companies invest in the future of this medium of high-speed communications. ■

next month . . .

A Move To Magnetics

A "depth" interview with officials of a midwestern bank explains the step-by-step procedure for their pioneer move to magnetic character recognition.

•

Special Data Handling Systems Vs. General Purpose

A guide for the evaluation of electronic data processing equipment, comparing general purpose computers with special systems tailored to the requirements of a particular business.

A class in electronics fundamentals is in progress here at Fort Monmouth, N.J., where the Army Signal School has a full-fledged TV operation. One demonstration such as this can reach out to a potential 460 receivers in classrooms throughout the base.

Closed-Circuit Television Takes Center Stage

CLOSED-circuit television, rapidly pushing itself out of the "gimmick" class, is demonstrating its ability to do a job in communications that will spell new horizons for business and industrial management.

Like many contemporary electronic devices, closed-circuit TV suffered in its initial stages from unfortunate promotion and publicity as a "wonder" tool and was looked upon by some as an expensive plaything—a "gimmick." This, in part, was undoubtedly due to its origin in the entertainment field.

However, its usefulness has already been demonstrated in a growing number of important applications, and non-technical minded executives—who might once have been prone to look askance at the suggestion that their plant or offices make use of closed-circuit TV—now are examining the systems on the basis of what they can do to speed up production and save money.

Credit for the rapid developments within the field is shared by the young electronics industry, which is making great strides in technical progress; the military, which is exploring every avenue of use; and the business world, which has recognized the potential of the equipment in commercial and industrial applications.

Cameras and receivers made today are refined to a point where equipment made 10 years ago seems like the horse and buggy in comparison with a T-Bird. General Electric, for instance, has recently introduced a camera that can "see" in almost total darkness—below the level of human sight. A cigarette lighter glow can illuminate an entire room sufficiently for a picture transmission. General Precision Co. has produced a closed-circuit camera

A crossing tender for the Delaware and Hudson Railroad in Cohoes, N.Y., adjusts a GE television monitor which shows him an approach to the main line from an industrial spur track one-half mile away. When a switching engine approaches he can make sure the track is clear and operate the gates at a nearby crossing.

and equipment that will transmit four times as much data as was once possible on standard 525-line television.

This makes it particularly valuable for fast transmission of large quantities of printed matter, alpha-numeric or symbolic information. More than 60 lines of small type can be shown and clearly read at one time.

From computer to screen

The industry is also beyond the first stages of development of equipment that will take information directly from a computer and instantly project it onto a large viewing screen. This represents an efficient new means of mass communication between the computer and as many interested people who need information simultaneously and in a great hurry. Furthermore, permanent copies of any projected image may be made in a few seconds. This device represents the joint efforts of Stromberg-Carlson and Haloid Xerox, Inc.

From the laboratories of TelAutovision division of TelAutograph Corp. has come a closed circuit system which delivers an automatic print-out of a coded number on a teletypewriter, while at the same time projecting a picture of the number on a television viewer. In addition, the system can produce a five-channel tape (MANAGEMENT AND BUSINESS AUTOMATION, Jan. '59).

These are some of the technical advances in equipment by only a few of the many companies busy in the field. The majority of applications are military in nature, but the potential for industry and business is clearly visible.

Management is impressed by these advances in

Bank officials at the World Savings Bank in Lynwood, Calif., have immediate access to the files centrally located on an upper floor—thanks to TV.

Signature and balance cards of depositors at the New York Savings Bank are transmitted to tellers more than two miles away by GPL cameras. Clerk can adjust camera for sharpest picture necessary.

In still another bank, the Beverly Bank in Chicago, a teller phones for information on a depositor's account and the requested data is placed under one of two RCA "Eye" cameras which is hooked up to a monitor near the teller.

technology, but it has a more pressing interest in the usefulness of such systems on a commercial basis.

Cost is high in Anaheim

The cost factor is important. Benefits of the system must produce an equalizing result from money spent. If a TV system extends from one plant to another, or between cities, telephone lines must be used. There is no firm rate schedules for this yet. In New York some time ago, a bank was charged $175 a month base price, plus $20 per quarter mile for a two and one-half mile cable from the main office to a branch.

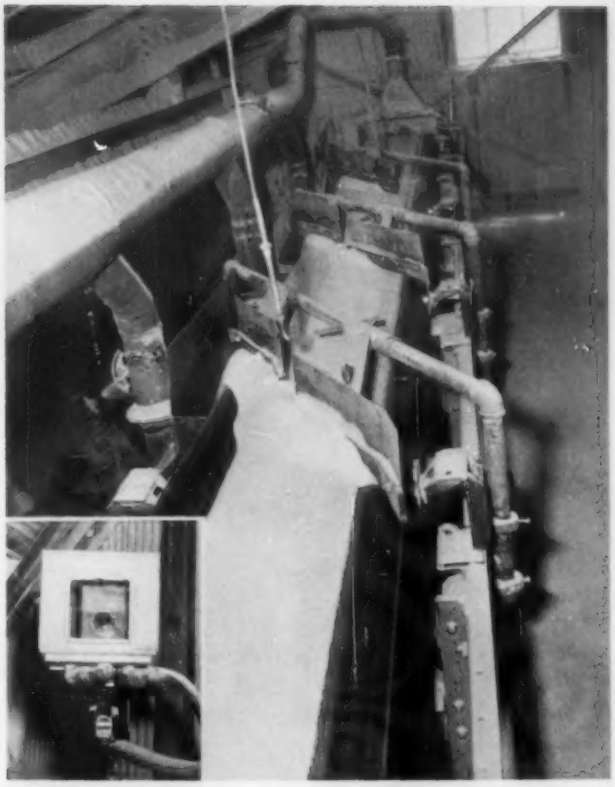
In Anaheim, Calif., the Pacific Telephone Co. has contracted to connect 17 schools with about 20 miles of cable. This costs $2,116 a month, with a $78,000 termination fee, written off in 10 years at $7,800 a year. In another California community, 12 miles of cable connecting nine schools costs $500 a month.

Manufacturers say the telephone companies are charging too much. The phone companies insist they are giving their best prices—for equipment and service costs money, too.

On the other hand, the cost of installing and maintaining closed-circuit systems within banks, offices or for in-plant purposes is relatively inexpensive when compared to the need for long-lines service.

Where and how is TV being used in business and industry? For one example, there are files-to-line communication set-ups. Visual dispatching of production schedules, sales and inventory charts, tables and graphs, engineering change orders,

Gordon B. Crary, Sr., general partner of E. F. Hutton & Co., compares the old ticker tape machine with the new closed-circuit TV unit by Kin Tel which brings instantaneous market quotations from the board room to the executive's desk.



Television keeps a close watch on a potential trouble spot in American Potash & Chemical's conveyor system. The splitters here are diverting soda ash into storage silos under the belt. The inset shows the camera that watches this operation. Someone watching the monitor can catch trouble immediately.

accounting records, stock cards and comparison of blueprints are all practical with closed-circuit TV.

Banks, the bastions of conservatism, are great users of TV for these purposes. The Pioneer Bank and Trust Co. in Shreveport, La. uses a Dage TV to speed records transaction between the main bank and two branches. A "TV scooter" is mounted on tracks in front of the bookkeeping files.

TV tells the teller

A dispatcher seated in the scooter is directed by intercom to the proper file, which is then placed before the camera. The teller or bank official requesting information sees it on the monitor.

A second stationary camera with a monitor in the bookkeeping department is used to transmit statements throughout the bank and its branches, and as an auxiliary general records camera. There are 14 monitors in the tellers' cages and two spares for private customer use in the system.

When the files of the Waterbury, Conn., Savings Bank outgrew their location on the main banking floor, closed-circuit TV made it possible to centralize them in a new area two floors above—and still have all record information immediately available. This is a business use which can work for many other types of operations.

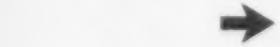
General Precision Laboratories designed a four-camera console for the third floor central file room. A card holder at the top of each console permits insertion of three different sets of signature and balance cards. Any of 11 tellers can receive the information.

At the opening of the Radio City office, the New York Savings Bank provided for a 333 percent increase in deposits—planning only a 25 percent increase in equipment and personnel. At this new 4,000 square foot office they can handle a deposit total of $250 million.

The reason—a five pound camera, no bigger than a football, operating at an extremely low light level with power supplied from an ordinary wall outlet. This unit is installed in the accounting room at the bank's main office.

Continued on Page 40

The Desk-Mate is a two-way radio unit designed by GE for management purposes. Here the busy executive is in constant contact with his plant, his business associates or his field men.



Business Goes Over the Air

An ever-growing list of business applications gives versatile, two-way radio a place of prominence in the world of communications.

UNHAMPERED by wires or cables and unaffected by time and place, two-way radio by its very versatility is a growing giant in the field of business communications.

Where hours or even minutes delay can result in the loss of money, production, and equipment, two-way radio steps in to close the gap between the man in the field and the home office, the business office and the warehouse, or the dispatcher and the truck driver on the road.

Advances in design and equipment during the past 10 years of its 25-year history has brought the two-way radio and its industry to full stature. Industry records indicate that approximately 1 million mobile and base station transceivers are in current operation. Major manufacturers estimate total sales at $70 million annually, and a recent influx of new users holds promise of a substantially larger market during the next two years.

Part of the reason for the new impetus was the establishment, a year ago, of the Business Radio Service. The Federal Communications Commission ruled that business firms could use radio to transmit any message necessary to the accomplishment of the business activity concerned. Users are no longer restricted to specific applications as was the case in previous F.C.C. mobile radio classifications, and they are now able to put radio to work on a wide variety of problems.

A new range of applications include credit checking, on-the-spot confirmation of price quotes and estimates by technicians, and assistance and direction of field sales forces.

A mortgage by radio

The man in the field, when he is in direct contact with management in the office, can proceed with confidence when he is preparing price quotes or trying to supply technical help to a customer. A well-planned two-way radio system functions as his line to an "operations nerve center" which can supply him with all the information he needs.

He can tell a customer if there is stock on hand, how long it will take to deliver a machine or parts, and can discuss price and cost factors without the need for "going back to the office to find out" if something is feasible.

This type of application has seen growing use

The executive is "never away from his desk" with an automobile equipped with an RCA two-way radio.

Glispin Distributing Co., Houston, Tex., uses two-way radio to control its fleet of 13 trucks on the road.

by vending machine service firms, real estate agencies, automobile dealers, farm implement service companies, electrical contractors, and all types of repair service firms, such as heating and refrigeration and construction machinery.

The list can easily extend to sales forces of heavy duty equipment and machinery, laundries, bakeries, and other service-sales groups. It is up to the ingenuity of alert managers to give rise to new uses. In New York, as an example, a bank executive conceived the idea of using two-way radio to speed up the time required to make mortgage appraisals.

Verbal instructions and reply

Control over moving vehicles, involved in service, delivery, or repair has been one of the major uses for the system. In trucking operations, both inter-city and intra-city, radio contact has often streamlined operations to the point where three trucks can do the job of four. A sharp decrease in backtracking, deadheading and other non-productive mileage waste are obvious results.

Radio control permits tighter scheduling of vehicle movements and the time of the sales and service people who use them. Continuous fingertip control by dispatchers and home office supervisors often results in a direct reduction in overtime, idletime or downtime.

Because managers are able to give direct verbal instructions to field men—and receive immediate confirmation—there is a possibility that much costly paperwork can be eliminated in a good number of cases. At the same time this places the responsibility for many decisions where it belongs—with management.

Mobile two-way radio has played a vital role in improving public safety for the past 20 years. It is hard for anyone to visualize police and fire departments without this equipment to help them coordinate their crime and fire protection efforts. This application has spread to the forest service, to highway maintenance, to toll highway control and to the point where a whole city is dependent upon effective radio control.

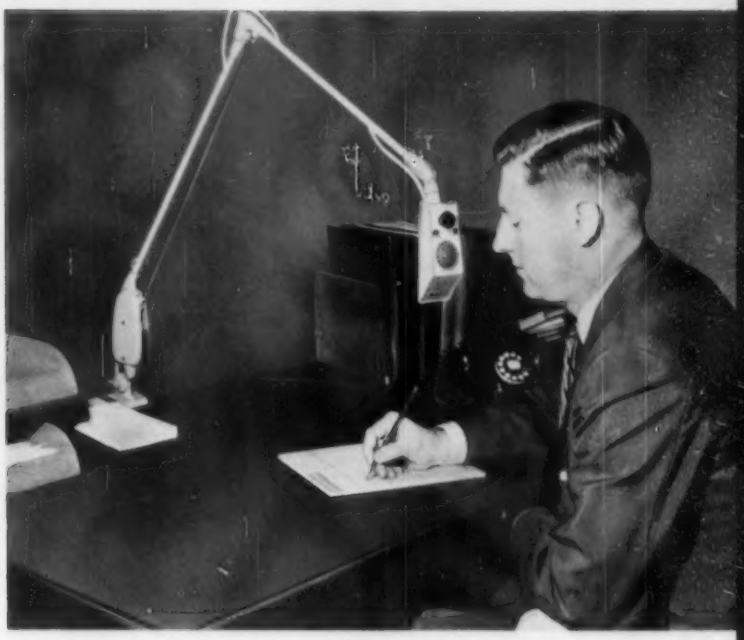
Tucson, Ariz., as the city in point, not only has police and fire control by radio but also has its public works department on an individual system. There are 66 mobile units installed in vehicles belonging to sewage, water and electric divisions with a remote control unit installed at the fire department headquarters for 24-hour surveillance.

Private industry, facing similar problems in timing and the need for prompt action, has utilized two-way radio to get materials to jobs at the right moment. Ready-mix concrete firms and asphalt supply companies are good examples.

The Industrial Asphalt Co. of Los Angeles, said to be the world's largest manufacturer of asphalt paving, has a system which includes 16 base stations and 28 mobile units in trucks, cars and a plane.

Asphalt is manufactured hot, delivered hot and

Transistor power keeps the GE two-way radio units in automobiles down to a minimum in size.



Less space in the office by using a Minitrol by RCA. Unit includes microphone, control and speaker.

spread hot by the customer. Any delay, mistake or breakdown in plant or delivery service means a loss in profits. Through the use of two-way radio, crews on the field can notify a plant when more asphalt will be required. The job supervisor can change the mix formula when necessary (as many as 20 can be required in one day's operation) and he can step up or slow down deliveries. Management is always in touch with every job in progress.

The plane has several important roles. It makes aerial surveys of possible plant sites, radios progress of paving jobs, and generally expedites observation as well as routing of trucks in a city known for extremely overcrowded motoring. Every minute a truckload of hot asphalt sits in a traffic jam contributes to the possibility that it will be unuseable.

The "mobility" of two-way radio accounts for the majority of its present-day applications. However, there are increasing numbers of "on location" uses being developed.

In the more localized operations of a factory, cannery, processing plant or warehouse covering acres of ground, a properly engineered radio dispatching plan can increase efficiency in the handling of materials on a non-schedule basis.

Water, in a dry area like Arizona, is considered a precious commodity, and any trouble brings immediate action from mobile crews in the field. The water department's radio reach covers 322 square miles since it serves the entire metropolitan area. Pump operators and maintenance men, moving throughout the district, are always in touch with the water plant. A telemetering system at the plant can pick up trouble or pressure information, and this can be instantly relayed to the men in the field.

Other public utilities, such as gas, electricity, and telephone companies, were also early users of two-way radio. Equipment failure, due to a storm or other disturbances, necessitates prompt action on the part of the repair crew. Because the crew is in constant and direct contact with headquarters, power can be cut off quickly to allow for repairs and restored immediately when the job is finished. This cuts the communication time lag completely and makes possible a minimum interruption of service.

Paging with a soft tone

A production line turning out tractors, for example, may be producing $50,000 per hour in equipment. The size of the parts going into the equipment and the value of sub-assemblies used make it economical and practical to maintain only limited reserves of parts and assemblies for the line. Radio equipped stock handlers can indicate shortages as they develop, locate materials rapidly and assign the necessary materials handling equipment to the area to transport the various components to the production line.

Radio paging in large plants and offices is

another "on location" use for low-powered two-way radio. In most cases, no Federal license is necessary for the system which takes the place of bells, public address systems and other forms of communication attempts.

Manufacturers have developed a very small individual radio receiver, weighing about 10 oz. This is worn by key personnel in the plant or office. A central transmitter, which can be controlled from many places through a special dial telephone, is completely selective in finding the person wanted. When a number is dialed, the person carrying the receiver hears a "soft tone" that indicates he is wanted. He pushes a button and listens to the message.

Such companies as the Gillette Safety Razor Co., National Aluminate Co., Shulton, Inc., Berger Machine Products, Inc., hospitals, hotels and department stores like Marshall Field's in Chicago, Abraham & Strauss in Brooklyn use this type of system.

United Transit Co. in Providence, R.I., was a pioneer in the use of two-way radios on in-city buses. Drivers are in constant touch with home base.

Two-way air traffic control

At Gillette, for example, key production engineers are equipped with paging receivers. Should anything go wrong on one of the production lines, the right person can be located in an instant. At the Edgewater Beach Hotel in Chicago, the maintenance electricians, supervisor and other service personnel all carry personal radio receivers, as do key members of the management team.

Recent technical advances fostered by the growing two-way radio industry are contributing to business-use possibilities. The industry is constantly developing smaller, more-compact, transistorized units which are proving adaptable to general utilization.

Military programs are also contributing to this drive as are government experiments. Most recently, RCA has brought out the Automatic Ground/Air/Ground communication system which is designed to permit automatic two-way radio communications between ground control and up to 500 aircraft every two minutes.

Preconceived messages can be transmitted between plane and ground without the need of oral conversation. By pushing a button, the pilot can receive a message from ground control displayed on a control panel in his cabin. These messages are also displayed on a console in the ground control room.

It is expected that someday these messages will be fed to the plane right from a flight-control computer (MANAGEMENT AND BUSINESS AUTOMATION, July '59 issue).

As is the case with many other devices, this equipment has the possibility of future use in a wide variety of applications. Leaders in this field, such as Radio Corp. of America, Motorola, General Electric and Philco, are working to develop more systems which can benefit American business.

The expansion of two-way radio is a tribute to the supplier and the thousands of users who are aware of the unique function this "natural resource" can perform. Radio belongs to all who need it, and with spectrum frontiers still to be conquered, it offers an unlimited potential in communication. ■

Acknowledgement

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Don Hones, plant manager (at left), and Lawrence H. Sevy, tab department supervisor, take the "pulse" of the Fabricon plant in the "Telecontrol" dispatch room. All production and inventory data, employe productive time, machine downtime, etc. is funneled here and registered, ready for further processing by the tabulating department.

Intercommunication Systems Improve Cost Control

E. J. Dolan, Fabricon production manager, keeps his finger on every operation in the plant—from any point in the plant. Telephone handsets can be plugged into strategically placed "Telecontrol" boxes so that direct contact is made with the control center and through there to any other station in the plant.

INSTALLATION of intercommunication systems in the plant area is helping many manufacturing companies to solve the problem of delay in gathering timekeeping and cost control data.

An excellent example is provided by the Schlegel Mfg. Co., a major producer of industrial textiles, which recently opened a large new plant in suburban Rochester, N.Y. The plant is equipped with a combined intercom and voice paging system which connects the entire production area with a centralized timekeeping department. This system was designed by engineers of the Stromberg-Carlson Division of General Dynamics Corp.

Central focus of the system is the "tower", a small, centrally located and elevated enclosure overlooking the major work areas of the plant. This center is equipped with four "turrets"—special-purpose switchboards serving all the intercommunication telephones. Special lines go to the payroll and machine accounting department.

A timekeeping staff of four (reduced from seven formerly required) receive time and production reports from more than 400 production

In the production area of the Schlegel Mfg. Co., loom operator reports the completion of one job to the timekeeping department by intercom telephone. He then receives his instructions for his next assignment. Telephones are located so that no operator has to travel more than 20 feet from his loom.

The timekeeper receives the job report and enters data on the operator's daily time card. Four timekeepers receive reports and issue assignments to more than 400 loom operators. Paging calls are also made from this control center.

employes. The information is entered on individual daily time cards in which hourly rate and other information has previously been punched. The cards, when completed, are sent to the payroll department for automatic processing through IBM equipment.

Another system, called Telecontrol, has cut unproductive labor costs by bringing better production control at the Fabricon Division of the Eagle-Picher Co. in Detroit. Tele-control, a product of Hancock Industries in Jackson, Mich., provides voice communication at all plant levels, and it automatically feeds production data to a central control room where it is recorded as input for data processing operations. This information is also displayed through the use of lights and counters on control panels, giving management an up-to-the-minute picture of the plant's production.

A direct intercom line to the control center brings quick answers to personnel in the payroll department where production information is added to punched job cards. Cards are then sent to the machine accounting department for cost analysis and the compilation of payrolls.

When production problems occur at any station in the 1,000-man shop of the John Oster Mfg. Co. in Milwaukee, the operator can notify the control room (pictured here). The supervisor dispatches a foreman to the scene by using the intercom, a part of the Telecontrol system.

Oster's punch press department foreman can advise the Telecontrol dispatcher that the machine is ready to complete die tryout as the machine operator checks the machine's controls. The Telecontrol panel in the control center automatically records machine down time and production time as well as pieces produced.

Centralized Dictation— A 'System' Secretary

A "network" dictating system makes its services available to many, yet it contributes substantially toward cutting expenses and saving time.

THE same factors which have focused management's attention on data processing and rapid external communications are the causes for the phenomenal growth in office dictating equipment sales.

Today's high volume of executive paper work, plus the need for tighter controls and clearer channels of communication, has brought about wider acceptance of machine methods to save the time of the businessman and his secretary. The long familiar sight of a secretary, shorthand book in hand, waiting patiently for her boss to complete a phone call or look in his attache case for a report is becoming hard to find.

The first post-war spurt in dictating machine sales came with the introduction of electronic equipment to supplant the acoustical machines that secretaries fought for years. This equipment overcame a serious morale obstacle and created wide acceptance among secretaries and stenographers in a period when capable workers were hard to come by.

The second noticeable increase in sales is in progress now. A result has been an increase in the number of manufacturers seeking a share of this burgeoning market.

But an important contribution to the automation of the office has come about through the introduction of centralized dictating systems. This is an area of vast potential savings in office costs which most firms have overlooked to date. Part of the reason is that manufacturers of dictating machines have not yet felt the need to train their staffs adequately to handle the "systems" selling approach.

There are some signs that centralized dictating will be coming into its own soon. Mr. James J. McKeon, vice president of The Soundscriber Corp., forecasts that the dictating industry will move in two directions—toward the larger systems installations and toward portable dictating equipment. Other manufacturers predict a much larger share of their output going into centralized systems, also.

Advantages of centralization

There are several outstanding advantages to centralized or "network" dictating. The most obvious one is the savings resulting from the use of fewer individual machines for a given number of dictators. Industry spokesmen are frank to point out that this also can be a reason that centralized installations are not pushed very hard by many of their salesmen.

There is also a tangible saving from the elimination of foot traffic in delivering belts and letters from office to office. All transmissions, whether actual dictated material or instructions, are made electrically.

One recording station operator can handle the transcription of an entire staff at the Sandusky Foundry in Sandusky, Ohio. The Pierce system shown here includes two master recorders serving the remote microphone dictation network and two "Voice-Acutated" units serving the PBX internal telephone dial dictation system.

But probably the most important advantage in the long run is its ability to make the services of automatic dictating available to many employees who previously were without. The "marginal" dictator with little correspondence formerly had to rely on longhand or other time-consuming methods. Plant personnel likewise have not had the usual dictating facilities of the front office. These are but two of the situations where remote dictating stations have speeded up the flow of paperwork considerably.

One of the earliest firms to explore the possibilities of centralized dictating was Pierce Dictation Systems. Today this firm is merchandising a unique system called Tel-Vac . . . voice-actuated dictation by telephone. Using any PBX or PAX internal telephone system, it eliminates the need for an additional dictating mike or special handset.

Another early system was produced by Gray Manufacturing Company. Its Phon Audograph system has been widely installed throughout the country.

Other established American manufacturers are very much aware of the large potential looming ahead and are training their sales forces to take advantage of it. Dictaphone is pushing its Telecord system and McGraw-Edison is making plans to promote its Televoice system more actively.

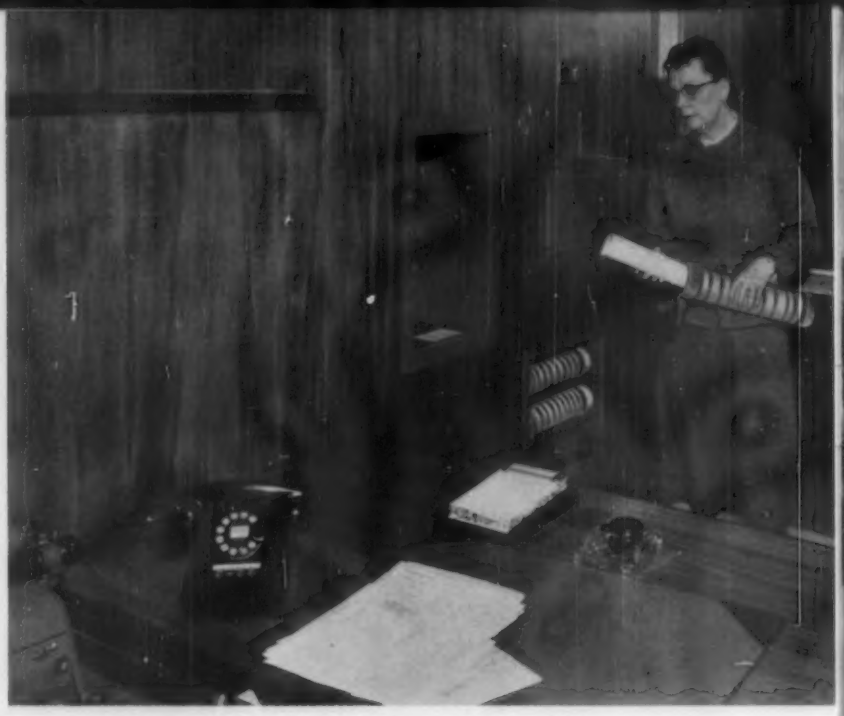
As yet, the U. S. distributors of dictating machines made abroad have not announced equipment for centralized systems. However, the time when they will jump into this part of the market is probably not far off.

Speak, and it shall be written

Tomorrow's executive will definitely be a user of some type of remote equipment according to present forecasts. Charles H. Goddard, Voicewriter division manager and vice president of Thomas A. Edison Industries, McGraw-Edison Company says, "The time will come when it will be possible to use any telephone, anywhere, to dictate through some form of teletype transmission with the message appearing almost immediately at the point to which it is addressed."

The machine everyone is waiting for, of course, is the one that will convert a voice message to typewritten or printed words. So far the voices from the research labs say only "maybe." With today's technological pace, however, the typist may soon prove to be as rare as the secretary who can take shorthand. ■

High-speed Tubes Carry Paperwork



Papers from the executive's desk flow to production, billing, or any department in the office or plant at speeds up to 25 miles an hour. Pneumatic tubes carry papers and cards faster than messenger.

MOVING messages, invoices, orders, letters or even small parts from one section of a large plant or office to another can be the "weakest link" in an otherwise automated operation.

This is why many companies are adopting their paper-flow procedures to pneumatic tube systems —which speed these items along at a 25-mile-per-hour clip through thousands of feet of tubing. Such systems have closed the gap between the automated data processing centers and the automated production line, mail room and shipping room, and the executive and production line.

Corn Products Refining Co. in Argo, Ill. now has a 15-station Lamson Corp. system in operation. It connects three and one-half miles of key points in the plant's shipping and warehouse system.

Orders from the sales department flow into the shipping office by mail and teletype. Here they are processed and a number of copies are made for distribution. Order tickets are fired by tube to the production departments and warehouses as well as the laboratory. When the order is filled and shipping instructions indicated, it is shot back to the shipping office for billing.

Previously a trucker had to go to the shipping office to pick up his delivery papers. Under the new system the company has a new mixed-car warehouse where drivers first check in. Here through the combined use of a new public address system and the airtubes, the drivers get their delivery tickets in one location and move from there to the proper warehouse.

To Corn Products, the new system means that papers are flowing more evenly and quickly from place to place in its chain of departments. The work in the shipping office no longer mounts up as the day grows longer and there is a uniform procedure in operation.

Another automatic pneumatic tube system, handling messages and other communiques, is in operation at the new Chicago Sun-Times newspaper building. Here there are 26 stations receiving and sending messages much faster than they once traveled by the most fleetfooted messenger boy. This installation, by Airmatic Systems Corp., has brought all of the newspaper departments into close physical contact and plays an important role in getting out the editions in less time. (MANAGEMENT AND BUSINESS AUTOMATION, Feb. '59 issue)

Pneumatic tube systems can carry punched cards, orders, invoices, letters, blueprints and other paperwork from one department of a plant or office to another in a matter of seconds—completely on an automatic basis. Relay panels control the flying tubes and assure efficient, correct delivery every time. This eliminates the problem of the "missing" or "chatty" messenger or other human delays and frees personnel for productive work while the paper is moving.

A 15-station automatic system today can handle up to 1,200 carriers an hour, eliminating any on-the-job delays or time lost in traveling from one area to another. ■

Scanning unit using sheet-feed system can transmit video facsimile to one or more remote printers.

An MBA Product Preview

'Videograph' Printer Sets Fast Space

The Videograph Printer is synchronized with scanning unit. It can print out 20,000 characters a second.

VIDEOGRAPH, a high-speed, electronic printing process capable of printing out characters, figures and symbols at the rate of 20,000 per second, has been developed and engineered by the A. B. Dick Co.

Heart of the printer is a special cathode ray tube called the "electrostatic printing tube." This converts video-like signals into a printing record or a visual display on a TV screen. The tube also makes it possible to deliver remote reproduction of pictorial and graphic information when the scanning and printing units are connected by a coaxial cable or microwave link.

In operation as a facsimile system, the equipment can scan either microfilm or original documents and other graphic source material—including hard copy and halftones—and reproduce or transmit this information on cards, labels, or sheets up to legal size.

An important factor is that Videograph, when augmented by an electronic device called a character generator, can translate computer language, magnetic tape, punched paper tape or punched cards and either print the translation or display it on a television screen.

According to Alan I. Roshkind, vice president of research and engineering, the equipment is able to print material at a number of different geographical locations from a single sending source, and it is capable of reproducing both graphic material and computer information simultaneously on one form.

The speed of Videograph, he said, makes it compatible with the output rate of today's modern data processing equipment. A contract has already been received from Time, Inc. to construct two systems to be used in conjunction with an electronic computer holding 10 million subscriber records.

The Videograph equipment will receive coded information from the computer tapes, edit out unwanted material and send the necessary signals to the printer, which will prepare rolls of magazine address labels at the rate of 36 labels a second.

In another example of its ability, a special television camera was mounted at the side of the railroad track. It scanned a moving freight train and transmitted a video signal by microwave to a traffic control center where a printer simultaneously reproduced a picture of the entire train, complete with car numbers, railroad designation and other information.

For a different type of application, the company announced that the Denver and Rio Grande Western Railroad will use Videograph for high-speed facsimile transmission of waybills and other documents over a microwave communications system connecting the main freight stations.

A. B. Dick visualizes the use of the system to reproduce checks in connection with "lock-box services" rendered by banks to accelerate clearings; reproduction of address labels; reproduction of accounting, statistical and scientific records from systems employing digital computers; display of stock market quotations on conventional television receivers; and addressing or producing of statements from digitally processed information. Circle No. 8-13

Continued from page 17

Teletypewriter switching equipment at Walston and Co., Inc., large New York City stock broker, receives stock orders from branch offices in 39 cities and automatically directs them to the floor of New York Stock Exchange. Equipment also routes messages from Exchange floor to designated branch offices.

the form of a paper tape on the "Finished Stores Circuit."

Transmissions on any given circuit as described above are received simultaneously by all stations which are called. The selection of stations is made through the use of predetermined "Call Directing Codes" which are placed on the request for material at the time of its origin.

The paper tape received in tabulating from purchasing, receiving, receiving inspection, and finished stores are select tapes in that they contain only statistical information. By converting these tapes to punched cards, numerous reports and analyses can be obtained by machine methods.

New in wire

Another excellent example of low cost communication equipment is the "electronic longhand" system of the TelAutograph Corp. This system uses wire to transmit handwritten messages throughout a plant or office on Telescriber units. Similar systems have been developed by the Comptometer Corp. and I. T. & T.

New developments are constantly offering improvements in all areas of business communications. Western Union has completed the installa-

Charles J. Trees, manager of Materials at General Electric's Small Aircraft Engine plant, displays a diagram of the mechanized manufacturing paperwork system, largest known installation of its type in one company plant. System can process between 200-300 orders daily.

Heart of the mechanized materials procurement system at GE. There are 75 pieces of equipment employed in this operation that has reduced procurement costs by thousands of dollars.

tion of a 12,000 mile nationwide Intrafax facsimile network to distribute weather maps to 49 Air Force bases. The same service is now available to industry and is being used by such companies as General Motors, American Airlines, Bank of America and others. The latest Intrafax machine, now being tested, is a robot "flat bed transmitter" that will automatically and continuously transmit a pile of telegrams, letters and drawings.

Telex, another new Western Union service, permits users to dial other subscribers directly for instant, two-way telegraph communication at special time long-distance rates. Still another development is Desk-Fax, a pushbutton facsimile machine with which telegrams are sent and received automatically in "picture" form.

Data by phone

A. T. & T. is now field testing a new service called Dataphone. A customer, using his regular telephone, can call the location to which he wants to send data and then both will switch their Dataphone subsets on to the connection over which they have been talking. The subset will convert the data into the form required for line transmission.

At the far end, another Dataphone subset will restore the signals to their original form for direct connection to data processing equipment of the punched card, paper tape or magnetic tape variety. The advantages of Dataphone are lower transmission costs and faster transmission speeds.

Using Dataphone service, Western Electric is developing a still-unnamed device to feed data into a central processing system. The development was sparked by a search on the part of Western Electric—the manufacturing and supply unit of the Bell System—to find better ways for telephone men to order supplies from the company. Under the new system, the men who order these supplies will have small identification cards containing punched-hole codes. They will also have a supply of similar cards with punched-code numbers describing items they would have occasion to order.

When using the service the employe first places his ID card into a card reader—part of the transmitting device. This action automatically establishes his authority to order materials and specifies delivery information. Next he inserts those cards covering the items he needs. Quantities of each item can be indicated by pressing numbered keys on the reader device. All data transmitted would be converted to punched cards at the receiving end.

This transmitting unit is portable, requires no A.C. power connection and can be plugged into any telephone line. It includes a monitoring loudspeaker. The device, in conjunction with Dataphone service, will make possible a direct connection to data processing centers in stores, offices and warehouses where orders would be recorded, merchandise routed, checks written and bills made out—all automatically.

The speed, efficiency and accuracy of business communication wire systems today, as fantastic as they may seem, will be far improved tomorrow due to the constant laboratory efforts of the wire services and equipment companies such as the Kleinschmidt division of Smith-Corona Marchant, the Kellogg Switchboard and Supply Co., a division of I.T. & T. and the Teletype Corp.

The lifeline of American business seems to be in good hands. ■

Closed-circuit TV

Continued from page 25

When a record is needed, the teller in the branch (10 tellers have 10 monitors) flicks a switch, is connected with the central accounting room, and asks for the desired information. The record clerk puts the proper card under the camera lens, and the picture is transmitted instantly.

There is a similar installation at the Beverly Bank in Chicago. A closed-circuit system, employing Radio Corporation of America cameras, monitors and control equipment, is helping to replace the traditional depositor's passbook.

Trains and ticker tape

A dial system utilizing six cameras and 16 monitors is in operation at the First American National Bank in Duluth, Minn. Here the RCA equipment is designed so that a bank employe at any monitor location can dial a special telephone to request data. Cameras are located in both the bookkeeping department and the savings department.

The use of TV to connect branch operations is also exploited by department stores. Through the system, customers are able to make payments at any branch. Instantaneous transmission of credit references, sales slips and accounts is possible. With a centralized control, there is no need for duplication of records, and all accounts can be located in one place.

One of the largest and most-publicized installations is a Dage TV system in operation at New York City's Pennsylvania Railroad station. It includes 105 cameras and 101 receivers and uses the dial switching method. The system is employed to handle space reservations and ticket selling.

The Long Island Railroad, also in Pennsylvania Station, directs customers to the proper train with 27-inch screens at each gate. The screens show the train departure time and destination, all controlled from the station master's office.

Several of the large airlines are using similar equipment produced by TelAutovision to speed flight information visually to various points in the sprawling air terminals.

Brokerage houses have come up with another use of the accounting-to-line application. E. F. Hutton & Co. has installed Kin Tel Division monitors which show tickertape moving across the screen in the executive offices. The cameras are in the board room and focus on the output of a ticker. Whether this saves money or is basically designed to impress customers is open to discussion. However, large stock firms with branch offices could set up relay systems someday that would flash information simultaneously to TV monitors in every branch.

Warehouse operation control is another part of this application of closed-circuit TV which has made gains in recent months. The remote control of traffic offers a manager the ability to keep an eye on the status of a load or unload operation.

The General Services Administration warehouses in Franconia and Belle Mead, Calif. both are equipped with Vicon Corp. equipment for general warehouse control. The Broadway Market in Redwood City, Calif. uses closed-circuit TV for warehouse surveillance.

The Yale Transport Corp. in New York City (See MANAGEMENT AND BUSINESS AUTOMATION, June, '59 issue) controls its New York City terminal with a closed circuit installation that achieves many goals in one attempt. Shipments move in and out of the terminal with a speed previously considered impossible because dispatchers have visual control and instant contact from a single central office.

While these installations have proven value, management acceptance of TV for intercommunication, *per se*, however, has been understandably limited. There is a reluctance to buy equipment which is little more than an improvement over the telephone, but technical advances are in the offing that will change this picture.

An interesting example is the Dage "Dial Data" system (MANAGEMENT AND BUSINESS AUTOMATION, May '59 issue) which utilizes a TV console and any number of monitors to provide instant access to records in a central location.

TV for togetherness

In another intercom application, the Hallamore Electronics Company in Anaheim, California has taken its own product and installed 72 receivers throughout the 181,000 square-foot plant. The system brings management into close contact with the employes. There had been a growing feeling that the firm, once a small "happy family" organization, had become too large. Employes felt "left out" of activities they once shared.

Now the TV sets have even taken the place of a house organ. The executives go on camera to talk to employes on all subjects, including business and labor relations. Visitors are screened when they come to the plant, and they are introduced simultaneously to all employes.

While the TV system is not the complete answer to management-employe relations, it has had its effect, according to Lloyd Hallamore, president of this Siegler Corp. subsidiary. It corrected some misinterpretations on the part of the employes to the point where a union election saw the potential

union pull only 17 percent of the employe votes.

The most widely accepted use for closed-circuit TV is surveillance—watching or supervising an industrial operation. Railroads watch freight yards, chemical companies watch conveyor processes, thermoelectric plants watch burners, steel mills watch hot ingots positioned for rollers.

Meters can be scanned from remote areas in simultaneous action. Inaccessible locations can be observed—such as radiation contaminated areas, under water, wind tunnels, rocket test sites. TV cameras can go and stay where man cannot venture in safety.

The nation's largest industrial television system for automatizing complex railroad freight operations has been installed by RCA at Southern Railway's new $20 million Inman Yard in Atlanta, Georgia.

A closed-circuit network embracing 10 cameras enables a clerk at a master console in a centralized yard office to "see" and identify over distances of more than two miles. The initials, numbers, and types of inbound freight cars are recorded so that each car can be switched in the classification yard. A similar installation is in operation at the road's Citico freight yards in Chattanooga, Tennessee.

Spectaculars in the classroom

Closed-circuit TV has also taken the place of large numbers of guards in high-security areas. One guard can sit at a desk and watch many corridors or entrances.

A guard costs about $6,000 a year; 4.5 men per post, seven days a week are needed if the premises are to be patrolled 24 hours a day. By eliminating one post, a company could save as much as $27,000 a year minus the cost of the TV.

There is another surveillance use—watching for shoplifters in department stores. Bamberger's, Alexander's, and Klein's department stores in New York all use these systems.

Standard Oil of Indiana checks its employes at the gate with a Dage TV. The ID card is inserted in a slot and the guard, with two receivers, sees the individual and his ID image together.

Other applications for closed-circuit TV include visual aid for training of personnel and the study of operations in hospitals, armed forces areas or industrial plants.

General Electric Company, Nortronics, and other firms use this training medium. Kinescope recorded film is cheaper to make than motion pictures, for one thing, and TV also provides an opportunity for the student to be "on the spot" during an actual operation.

At the recent NMAA Conference in St. Louis (MANAGEMENT AND BUSINESS AUTOMATION, July '59) 1,700 machine accountants were able to view the operations of three large computer installations on a giant screen in the Chase Hotel auditorium. This is believed to be the first use of kinescope for a business seminar, and the audience was enthusiastic in its response.

The Army, especially at Fort Monmouth, New Jersey, has gone into TV training with a full-scale production. The U. S. Army Signal School has recently installed the world's largest military educational closed-circuit system. RCA has installed 468 receivers to bring instruction courses and other training material to a student body of 6,000 men.

The system is expected to "pay for itself" within a year's time in man hours saved as a result of the elimination of individual motion picture projectionists in each classroom. As many as 15,000 men can watch a single program or announcement if necessary.

The limited number of applications for closed-circuit TV presented here obviously does not cover every use or potential use of the equipment. Literally, the surface has only been scratched, and the future is certain to provide new equipment and new uses of this type of a system for both industry and business.

Certainly the future will see closed-circuit TV playing an indispensable role in business communications. ■

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Tabulating card holders in shelves on storage walls

Card holders stacked 2-high on shelves

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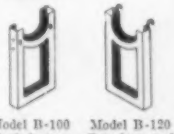

Model B-100 Keyhole type card holder

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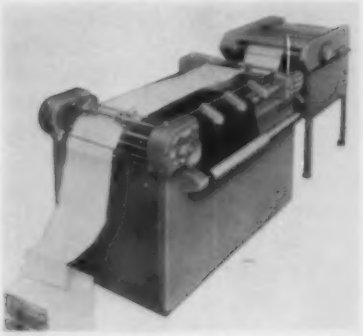
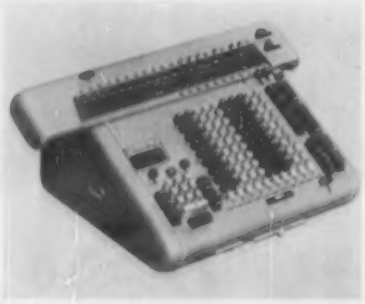


The Uarco Model 742 all purpose deleaver incorporates five new features to increase forms handling efficiency. The unit can remove from one to seven carbons in a single pass and has a trimming unit which removes one, both or neither control-punched margins of one to 12 copies. It features a carbon spindle to wind used carbons for disposal but can also deleave sets of forms not utilizing carbon, such as NCR or carbon coated forms. It permits deleaving of continuous tabulating forms which must remain fastened at one side. Circle No. 8-4

Serial Entry Calculator

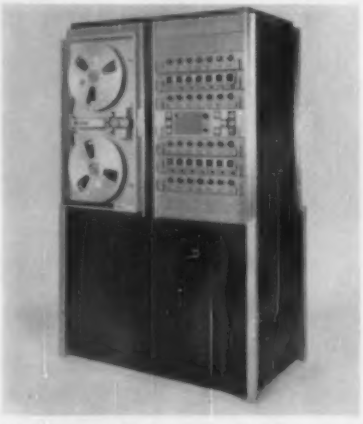
Solenoid actuated operation is available in the new Victor Adding Machine Co. serial entry Digit-Matic calculator which has numerical keys, addition and subtraction keys and functional keys all solenoid energized. Electric typewriters, punched card equipment, calculators, scales or data tape readers can program and key the unit. It is suggested for invoice billing, toll charges, temperature gradient, density computation and various other types of applications. A semi-automatic model is also available. Circle No. 8-16

Calculator



Chain multiplication and grand total accumulation are two features of the new Model SBT Friden calculator. It is said the powered actuating bars require 40 percent less pressure in operation which speeds the addition, subtraction and semi-automatic functions of the machine. The company has also unveiled a new adding machine, Model ACY-10, which has a 5½-inch platen with adjustable guides to permit insertion of paper in several widths. A front-feed aperture allows direct insertion of tickets, pass books, envelopes, deposit slips and other forms. Circle No. 8-1

Magnetic Tape Recorder



A new analog magnetic tape recorder, the FR-600 will be unveiled by Ampex Corp. at the Wescon show in San Francisco. This unit offers all-transistor amplifiers and air-lubricated tape guiding. It is the firm's first recorder to offer all solid-state electronics. FM, pulse-duration modulation, direct or digital recording modes are available through plug-in amplifier modules. Handles ½-inch and 1-inch tape. Circle No. 8-2

Photo Copy Machine

A flexible, plastic sealed bag dispenses and conserves the developer fluid used in the new Speed-O-Print photo-copier. The fluid is held in the bag with a special valved outlet that forms an airtight, liquid-tight seal with the developer tray. When the back of the machine is closed, developer fluid automatically flows into the tray, ready for use. When unit is idle, the fluid returns to the bag. The machine itself is light in weight and can be used anywhere in the office. Separate trays hold positive and negative papers at the bottom. Circle 8-17

Paper Jogger

A new electromagnetically vibrated paper jogger, designed to speed the processing of tab cards, office papers and mail room material, is the latest offering of the Syntron Co. The PJ-25 is said to be especially adaptable to work with automatic data processing equipment for straightening data cards, records and the like prior to machine accounting and microfilming. It vibrates at a rate of 3,600 times a minute, and power can be adjusted to suit the type of paper being handled by turning a rheostat dial. Circle No. 8-9

Tab Record Binders

Wilson Jones Co. has developed this new line of nylon post binders at an economical price for use as a binder to house records that are stored or referred to infrequently. The binders can accomodate 3,000 sheets or up to 10 inches of paper. Either 14 or 15 line models for burst or unburst sheets are available. All feature the WJ "Cyclone" locking mechanisms, which is flush with the top surface. Circle No. 8-11

Data Conversion System

The Foto-List system, developed by Vari-Typer Corp., automatically converts data contained on file cards into consecutive, justified lists of columns of text. It also produces a negative ready for plate-making. The file cards are fed into the unit and pass before a camera with "slit vision" which records the line on a roll of film at 7,200 lines per hour until page depth is reached. It then begins another column for another paper and the negative is ready for stripping and plate-making work. Circle No. 8-8

Photocopiers

Two new photocopy machines, both imported from Denmark, are now offered by American Dictating Machine Co., Inc. One is a flatbed model, the ADM Planocop, for work with magazines, books and pasteups. The other is the ADM Printess, a general office copying machine handling originals up to 14 inches wide. Both machines make copies on a wide variety of papers, including the new "medium" papers, and reproduce any color or print type. Circle No. 8-5

Offset Press

The Dual-A-Matic offset press, recently introduced by Davidson Corp., is said to provide sit-down operation and fingertip control. All controls are accessible to an operator seated before the machine, and the changing of a master has been simplified to a matter of seconds. There are several attachments available, including an automatic counter which stops the press at any number and a "piggy-back" feed assembly. Electronic programming systems can be added to perform pre-set cycles. Circle No. 8-12

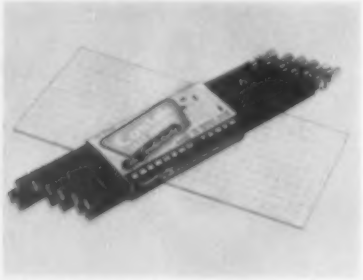
Electric Typewriter

An electric typewriter which is one-half the weight of a standard office electric model and priced at $179.50, approximately one-half the price of office models, has been put on the market by Smith-Corona Marchant, Inc. Designated the "Electra 12", the new machine features a full-size keyboard and most of the standard electric typewriter features. It is designed for the professional man's office, but priced to make the electric typewriter practical in all office uses. It has an 88-character keyboard and holds paper up to 12⅛-inches wide. It weighs about 19 pounds. Circle No. 8-3

Account Numbering System

VIStronic, a prepackaged simplified alphanumerical account numbering system which consists of 1 million prelisted numbers each complete with an electronically computed check digit for automatic machine verification of account selection, is now being manufactured and sold by VISIrecord, Inc. The company has designed a full range of housing for this system, previously described in the MBA Showcase, April '59 issue. The units shown here hold 1475 indexed sheets providing space for a total of 376,000 account numbers in both trays. The mobile well table offers convenient working height. These are also desk-top trays in the line which hold 750 sheets or a total of 96,000 account numbers. Circle No. 8-18

Mark Sensing Pencil

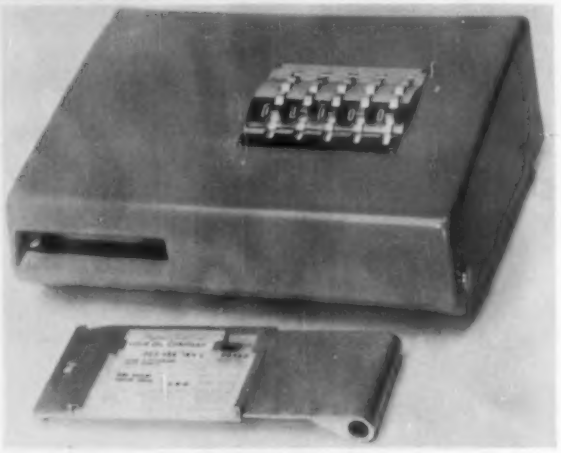


The Contak No. 440, a high-conductivity lead pencil designed for use on electronic mark sensing and test scoring tabulating machines has been introduced by the Eberhard Faber Pencil Co. The 440 is said to be useful in eliminating the need for punching, especially in processing field reports. Circle No. 8-10

Electric Stapler

The Staplex S-54-H heavy-duty automatic electric stapler has been designed for applications requiring a heavier thrust in stapling, such as for stapling punched cards and banking forms. Staplex Co. also recommends the machine for routing applications such as with bills, booklets, reports, bags, envelopes and invoices. A single contact control activates the unit to drive staples into the cards, papers or other materials. No hand or foot control is necessary, and there is no motor. Circle No. 8-6

Charge Sales Systems



Two point-of-sale systems, the Readatron and the Typatape, are currently available from the National Data Processing Corp.

The Readatron system is for charge sales use. It is based on the use of an embossed, or debossed, plastic credit card, and a sales invoice which is an original and a copy; one of these being either a 51-column or an 80-column punched card.

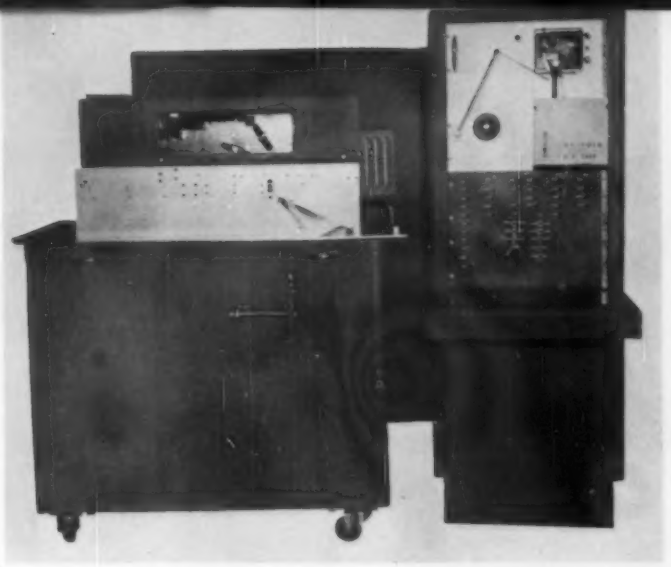
The credit card and invoice are placed on a Record-A-Board device and all sales information is written on the invoice. The Record-A-Board is then placed in the Readatron Recorder and the amount of the sale is set on a top dial. The department number, customer's number and the amount of the charge sale are then recorded on the top of the invoice in block numerals. The date is printed but not read or punched.

When the invoice is signed by the customer, providing an audit for the amount of the sale printed on the invoice, the customer's copy is detached and given to him. The amount on the store copy can be recorded through the charge key on the cash register for control purposes, and the invoice then sent to the machine accounting department.

A Readatron converter, a photoelectric reader of modular construction attached to an IBM 024 or 026 card punch, reads the block numbers and punches them into the card. The cards can then be processed through billing equipment.

The Typatape system records information on tape through the use of code. The Typatape Recorder can be attached to hand adding machines, electric machines, cash registers, window posting machines and most conventional accounting or bookkeeping machines. All or part of the information can be recorded, and the tape can be removed as often as desired for transmittal to the data processing department.

The Typatape Converter, similar to the Readatron model, attaches to the card punch and converts the Typatape to punched cards. If a computer is in use, this can be converted to magnetic tape rather than cards. This applies to both converters. Circle No. 8-12



An MBA Product Preview

The MX-2021 Print Reader senses typewritten characters at the rate of 200 per second, translating them into electric signals. The output can be punched tape, cards, magnetic tape or be fed to a computer.

IMR Developes Versatile New Print Reader

The electronic "eye" of the scanner reads the message which has been fed to the print reader. Light is transmitted through an optical projection system to the page and picked up by the scanner for conversion to electric signals.

A NEW and advanced print reader machine, the MX-2021, has been designed for the U.S. Air Force Air Research and Development Command by Intelligent Machines Research Division of the Farrington Mfg. Co.

In using the word "Advanced," IMR stated that the MX-2021 is superior to its other 25 models in that it reads ordinary typewritten sheets having both upper and lower-case alphabetical characters; numerals (which are self-checking for accuracy); and punctuation symbols.

As it scans a line at a time, the machine reads the information one character at a time; and upon identification, using stored electronic logic, it instantaneously converts the information into electrical signals at the rate of 200 characters per second.

The signals are now ready for further machine processing, and the output can be punched paper tape, punched cards, magnetic tape or fed directly into electronic computers.

The MX-2021 uses a scanner to produce these TV-like video impulses from the typewritten characters on a page and then analyzes the pattern for various identification clues. It can ask itself questions (testing, for the identification clues) continuously and simultaneously, and after answering "yes" or "no" to a few of its own questions, it makes a sophisticated analysis in identifying the pattern.

The Air Force is converting communications, indexing, abstracting and other information-processing problems into a form which avoids all subsequent manual handling. It is necessary that all technical information be indexed and abstracted so that scientists will know it exists and where it can be located. This was done by machines previously, but all original data had been manually entered by keyboard operators. With 30 of the machines in operation, the Air Force expects to automatically read and process information at the rate of 10 million pages a year.

At the present time this machine can read only one type style, but research is continuing to achieve the reading of all type styles. Circle No. 15.

NEWS

Pentagon Fire Razes Three Computers

Gutted interior of the Air Force Computer Center in the Pentagon. Workmen, 48 hours after the blaze, were at work installing new ceiling ducts. Fire was believed to have started between an acoustical ceiling and the concrete roof shown here.

Three IBM electronic computing systems, a 707, 705 and 709, were destroyed in the July 2nd flash fire that swept the Air Force Computing Center in the Washington, D.C., Pentagon.

Extensive damage was also incurred to EAM equipment of the National Guard Bureau located on the floor below the Air Force Center. In addition to the $6 million equipment loss some 5,000 reels of magnetic tape were destroyed, creating a mammoth record retrieval program for the Air Force.

The tapes, containing information about Air Force personnel, installations and operations, will be recreated from source documents—a job expected to take at least six months.

Despite the magnitude of the fire, there was little delay in resuming operations. A giant airlift of EAM equipment and around-the-clock emergency repair service by hundreds of IBM engineers restored service to the National Guard on the following Monday, July 6.

On July 7, a new 705 system was rushed from the IBM plant in Poughkeepsie, N.Y. and set up for Air Force use at the Council for Economic and Industrial Research (CEIR) in Arlington, Va.

On July 9, a large-scale IBM 709 computer system was installed for Air Force use at the District of Columbia Transit Building offices of Technical Operations, Inc.

Within 24 hours after the fire, Air Force statistical operations were proceeding on schedule through the use of extra shift time on other IBM computers in the area. According to Col. Marshall R. Gray, director of statistical service for the Air Force, there was no serious inconvenience caused by the weekend interruption of service. He expected to be back in business in the Pentagon space sometime in August.

Cause of the fire is undetermined. It is reported to have started in the ceiling of the first floor. Damage to the building is estimated at $200,000.

Death Takes MBA Vice President

George C. Wheeler, vice president and eastern manager of MANAGEMENT AND BUSINESS AUTOMATION died suddenly on June 29, following a heart attack in his home in Scarsdale, N.Y.

Mr. Wheeler spent 42 of his 58 years with The OFFICE APPLIANCE Co., publishers of MBA and OFFICE APPLIANCES magazine, starting as a part time worker while he completed his schooling.

He was named manager of the Service Bureau in 1922, and for several years worked in advertising production before he moved into the advertising sales department.

In 1929 he moved from New York to Chicago as assistant eastern advertising manager, and in 1940 he became manager of that sales office.

During his long years in the office equipment industry, Mr. Wheeler

George C. Wheeler

both watched and participated in the rise of business automation. For the past two years he had been actively engaged in the groundwork necessary to launch MANAGEMENT AND BUSINESS AUTOMATION magazine, and his efforts were directed along those lines at his untimely death.

He is survived by his widow, Mrs. S. Adelaide Wheeler; two sons, George C. Jr., and Philip, and a daughter, Mrs. R. A. DuBreiul.

WESCON Reveals 'New Look' Program

The technical program committee of the 1959 Western Electronic Show and Convention in San Francisco, August 18-21, has selected 120 papers for presentation in 40 sessions mornings and afternoons in the Cow Palace. This is a reduction from the usual number of papers.

A forty-first session on "Human Factors in Engineering" has been scheduled for a four-man panel program without formal papers. An evening session will cover "The International Geophysical Year in Retrospect" with Dr. Lloyd Berkner of New York as the speaker.

The "new look" pattern is developed in a series of field trips to complement the technical program. Tours have been set up to such places as the Dalmo Victor Co. (military microwave techniques), International Business Machines Corp. new computer center, Eitel-McCullough, Inc., Lockheed Aircraft Co., Ampex Corp., Stanford University, Varian Associates, and the Stanford Research Institute.

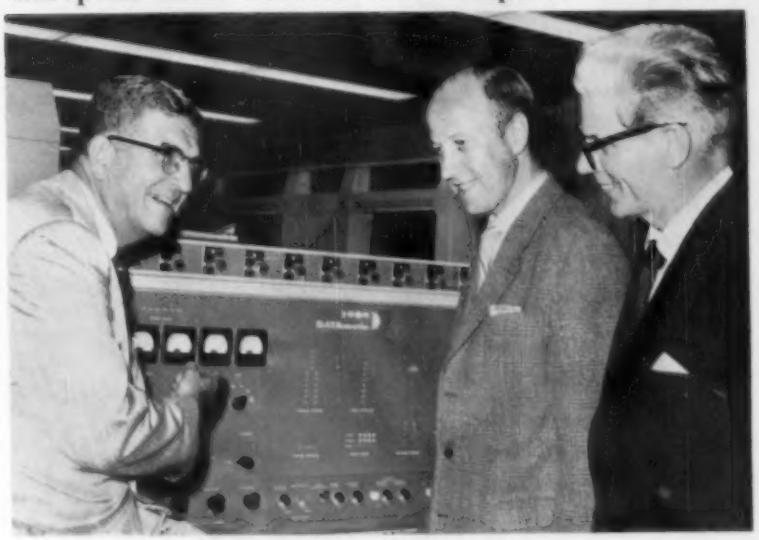
More than 100 volunteer workers, under the chairmanship of Walter Selsted of Ampex Corp., have completed arrangement plans for the conference.

Included in the "extra-curricular" activities will be a gala "WESCON Welcomes the 50th State" party on opening day. This is the main social event and will have a Hawaiian motif complete with grass hut, flowers flown in from the Islands and Hawaiian dance music and entertainment.

It was also announced that Dr. Herbert F. York, director of defense research and engineering and one of the top policymakers in the U.S. Department of Defense, will be the speaker for the All-Industry luncheon which is the traditional culmination of the show and convention. Dr. York is considered as one of the nation's outstanding nuclear scientists.

One additional first for the San Francisco conference is an industrial design competition and show designed as an effort to pay formal attention to the work of industrial designers in the electronics industry. A total of 140 entries from 82 companies will be judged.

European Labor Leaders Tour Computer Installation



A nine-man automation team of European labor leaders recently toured the Michigan Blue Cross-Blue Shield headquarters to see its Datamatic 1000 installation in operation. Pictured here are William S. McNary, executive vice president of Michigan Blue Cross (left) explaining the control panel to Gerardus Kriek, secretary of the Roman Catholic Trade Union of Amsterdam. At the right is Al Barbour, president of the Wayne County (Detroit) AFL-CIO Council.

Introduce High-Speed Electronic Printers

Stromberg-Carlson, division of General Dynamics Corp., and Haloid XeroX, Inc. have combined efforts to produce the SC 5200 high-speed electronic printing systems for registered printing of computer data on pre-printed forms.

The systems print numbers, letters or symbols at speeds up to 5,000 lines per minute on pre-printed forms. Uses foreseen for the equipment include large volume processing of business forms such as invoices, checks, statements, premium notices and inventory records in financial institutions, insurance companies, government agencies and manufacturing firms.

Manufacturers to Show Business Equipment

More than two acres of exhibit space has been allocated to 35 manufacturers of business machines and equipment for the inaugural Business Equipment Exposition in the Washington, D.C. National Guard Armory, September 23-25.

The show, sponsored by the Office Equipment Manufacturers Exhibits, Inc., is expected to attract 25,000 in its first run.

Univac "Solid State" Attracts Customers

The Univac "Solid State" electronic computer, introduced recently by Remington Rand, has already been ordered by over 100 companies across the country.

The Solid State 80 has received the most attention, but orders are also coming in for the new 90 model, Remington Rand spokesmen said.

The new computer system rents for $6,950 a month and purchase price is $347,500. Its main advantage is that it performs the functions of its large-scale predecessors, but with the advantage of lower cost, reduced maintenance and lower power requirements, Remington Rand pointed out.

Several of the units were delivered in Europe as early as last year, with the first going into the Dresdner Bank in Hamburg, Germany. Others are in operation in insurance and public utility firms on the continent.

Western Joint Computer Conference Set for May

The dates for the 1960 Western Joint Computer Conference have been set at May 3, 4, and 5 in San Francisco once again.

MBA Reviews

Programming Business Computers.

By McCracken, Weiss and Lee. Published by John Wiley and Sons, Inc., N.Y. $10.25

One of the best, if not the first, books written in "common language" and directed to the layman who is involved or interested in the day-to-day applications of electronic computers to business data processing.

The authors are, Daniel D. McCracken, formerly manager of the computer training department for G.E. and now a consultant in computer programming; Harold Weiss, manager of application studies at G.E. and assistant professor of General Business Administration at Arizona State University, and Tsai-Hwa Lee, a computer application analyst at G.E. and former director of the Detroit Univac Computing Service Center for Sperry Rand.

The three men present a clear and understandable word picture beginning with a discussion of fundamental topics which includes the nature of the data processing problem, central concept of the file, flow charting and the general characteristics of electronic computers.

They also do an excellent job of explaining all the techniques of computer coding and use a hypothetical computer called DATAC, which is actually the compilation of the features of many machines.

Personnel Administration: Evaluation and Executive Control.

By James H. Taylor, vice president of Industrial Relations Counselors, Inc.; Professor of Industrial Relations, School of Business Administration, University of Michigan. McGraw-Hill. Price $7.00.

Mr. Taylor covers personnel administration for any size or type of organization. He explains how to establish and maintain effective personnel programs and describes how to evaluate major plans and the effectiveness of the personnel staff in carrying them out.

He also discusses methods of attracting the right kind of talent for the continuing growth of a firm and offers step-by-step procedures for recruiting and hiring, training and developing, transferring and promoting.

Modern methods of wage and salary administration are presented in detailed form, and workable plans are presented to the reader for all phases of wages, salaries, overtime, profit-sharing, bonuses, stock options, and the like.

Automation and Society.

Edited by Howard Boone Jacobson and Joseph S. Rouck. Published by Philosophical Library. $10.

A compilation, of case histories, reports, and discussions covering the concept of automation and its relation and effect on modern society.

The authors have gathered together non-technical presentations that read as current history and makes a readable introduction to this challenging development in society. Considered conclusions of some 32 experts are included.

Touching briefly on the contents: "Automation in the Manufacturing Industries" by Ralph J. Cordiner, chairman of the board of General Electric Co.; "Post Office Automation Progress" by L. Rohe Walter, Special assistant to Postmaster General; "Automation and the Accountant" by Charles L. Keenoy, vice president of engineering and product development for National Cash Register Co.; "Automation in Data Processing for the Small to Medium Sized Business", a case study by Curtis Jansky, product planner for Royal McBee Corp.; "Automation: Weal or Woe" by Edward R. Murrow, vice president Columbia Broadcasting System; "Automation and Responsibility" by William W. Barton, president Barnes Co., Rockford, Ill.; and even a dissertation on the technological and economic problems of automation in the U.S.S.R. by K. Klimenko, Academy of Sciences of U.S.S.R.

On Request

The following booklets, catalogs and brochures are considered of interest to readers of MANAGEMENT and BUSINESS AUTOMATION. Copies can be obtained by using the convenient Reader Service Card and circling the corresponding key numbers.

ROYAL MCBEE CORP.—Application Report No. 12 is a four-page folder describing how the Simpson Optical Mfg. Co. of Chicago is using the Royal Precision LGP-30 electronic computer to design new optical devices. Circle No. 8-22

INDUSTRIAL ACOUSTICS CO., INC.—"An Introduction to Noise Control" is a 24-page brochure written for business executives unfamiliar with the methods of overcoming noise problems. The booklet offers pictures and application case histories from several industries. Circle No. 8-23

AMERICAN ELECTRONICS, INC.—The American Data Division has prepared a presentation of the full line of modular time and event recorders the division produces. Included are tables showing standard combinations possible using standard counters and time units as well as a guide for specifying individual data printer requirements. Circle No. 8-24

REMINGTON RAND — "Invitation to Learning" is an illustrated brochure offered to management which outlines the various kinds of computer orientation seminars conducted for users and non-users of the company's data processing equipment. Announcement of forthcoming seminars is included. Circle No. 8-25

COPEASE CORP.—A specially prepared booklet, "The Truth About Office Copying Machines" has been offered by the company as a guide in selecting a process and machine. Circle No. 8-26

MBA's Calendar

August 18-21—Western Electronic Show and Convention, San Francisco. Contact Wescon Headquarters, 1435 S. La Cienega Blvd., Los Angeles 35, Calif.

August 24-28—Electronic Data Processing Workshop Seminar sponsored by American Management Association. Limited to firms which have EDP installations or are planning installation. Write A.M.A., 1515 Broadway, New York 36, N.Y.

September 14-16 — Electronic Data Processing Workshop sponsored by the American Management Association in Chicago. For details write A.M.A., 1515 Broadway, New York 36, N.Y.

September 21-24—14th annual Instrument-Automation Conference and Exhibit of the Instrument Society of America, Palmer House in Chicago.

September 21-23 — 35th annual National Association of Bank Auditors and Comptrollers convention, Boston, Mass. Statler-Hilton Hotel. Headquarters, 38 S. Dearborn, Chicago 3, Ill.

September 22-25 — First national exhibition by Office Equipment Manufacturers Institute. National Guard Armory, Washington, D.C. Contact Rudolph Lang, 777 14th St., N.W., Washington 5, D.C.

October 4-8—National Business Forms Associates 14th Annual Convention at Chalfonte Haddon Hall Hotel, Atlantic City, N.J. Information from F. J. Ring, secretary, 207 E. Broward Blvd., Ft. Lauderdale, Fla.

October 12-14—International Systems Meeting of the Systems and Procedures Association of America, Royal York Hotel, Toronto, Canada.

October 18-23 — National Business Show, New York Coliseum, New York City.

October 28-29—Sixth annual Computer Applications Symposium sponsored by Armour Research Foundation of Illinois Institute of Technology at the Morrison Hotel, Chicago. Contact M. J. Jans, conference secretary, Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

November 11-13—Sixteenth national meeting of the Operations Research Society of America, Huntington Sheraton Hotel, Pasadena, Calif. Details from ORSA, Mt. Royal and Guilford Aves., Baltimore 2, Md.

November 16-20—Postponement of Fifth International Automation Exposition has been announced by show management. It has been rescheduled for 1961.

December 1-2—1959 Eastern Joint Computer Conference, sponsored by the AIEE, ACM, and IRE. Statler Hilton Hotel, Boston, Mass. F. E. Heart, Lincoln Laboratory, Lexington, Mass., is chairman.

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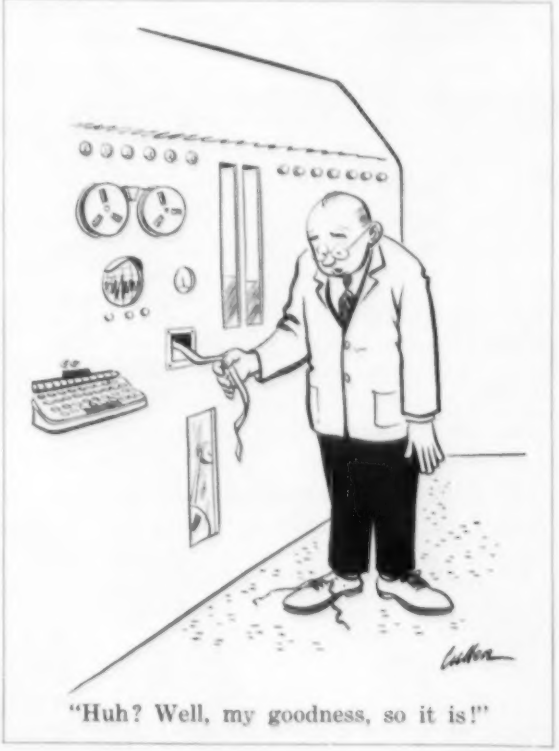

"Huh? Well, my goodness, so it is!"

EDITORIAL

Records To Burn

The fire that ravaged the top-secret quarters of the Air Force Statistical Center in the Pentagon last month (see News, page 46) gives rise to a question.

Why, particularly in view of the military's normally overzealous efforts at security, was not thought given to safeguarding the valuable records of the Center from the threat of a fire? Over 5,000 reels of magnetic tape, containing volumes of information about Air Force personnel, installations, and operations, were destroyed in the blaze. The loss necessitates a return to source documents in order to re-create the tape files. Air Force spokesmen estimate that the job will take about six months. No estimate was given as to the cost.

We realize that the tapes in actual use were subject to the flash fire, but we doubt that even the military has a computer system that can accommodate 5,000 tapes spinning around simultaneously.

The incident should alert all management to the need for adequate fire protection in their own data processing installations. While it is the essence of a good system to be able to recreate any punched card or tape entry, the time and cost to do so in the event of total record destruction could create havoc in the average business operation.

It is not uncommon to find accounts receivable card files, representing millions of dollars of income, lying in open file drawers with no thought of fire protection, even though destruction of these cards would present a serious, if not disastrous, problem. In many companies, the accounting department follows the faithful evening practice of locking the ledgers and other book records in a fireproof vault. Yet, in an adjoining room, the lifeblood data of the company, in the form of cards or tape, lies totally unprotected. And chances are the source documents are no better safeguarded.

How many business organizations are any better prepared for fire than was the Pentagon? The housing plans for data processing seem to have overlooked the necessity for fire protection. Perhaps the Air Force calamity will stimulate thinking in this direction.

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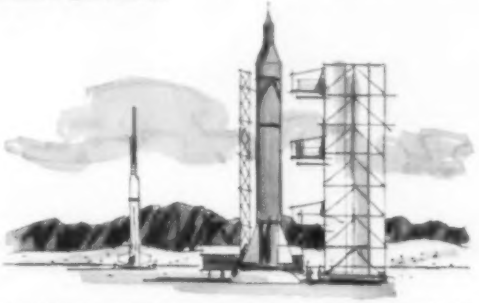

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